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# **Model 20 Constant Speed Blender**

**120-60: For Cement, 115 Volt**

**120-60-1: For Cement, 230 Volt**

**120-60-F: For Fracturing Fluids, 115 Volt**

**120-60-1-F: For Fracturing Fluids, 230 Volt**

## **Instruction Manual**

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## ***Intro***

OFITE's Model 20 Constant Speed Blender was designed to prepare well cements for testing according to the guidelines stated within API Specification 10. Research has demonstrated that the properties of well cements are highly dependent upon mixing procedures. In addition, studies have indicated that when constant speed blenders/mixers are used, data obtained from thickening time tests has greater reproducibility and generally correlates better with data obtained from other laboratories. The Model 20 was designed to provide a means of consistently preparing cement slurries for testing purposes and can be utilized to mix cements according to the procedures stated by the API.

## ***Description***

The proper amount of mix water is carefully weighed and poured into the mixing container of the blender. The rotational speed is set to 4,000 RPM and allowed to stabilize at this speed. The "TIMER" switch is pressed and the cement is immediately added to the mix water. The cement should be uniformly added to the water in less than 15 seconds. After 15 seconds the rotational speed is automatically increased to 12,000 RPM and the slurry is mixed an additional 35 seconds. A microprocessor is utilized to maintain the rotational speed within the recommendations established by the API and is independent of fluctuations in line voltage and the viscosity of the cement slurry.

The 120-60-F Constant Speed Blender is intended for testing Fracturing Fluids. The rotational speeds are set to 500 and 1,000 RPM respectively.

## Components

#122-075	Fuse, 7 Amp, 5 mm × 20 mm
#122-077	Fuse, 10 Amp, 5 mm × 20 mm
#122-200	Hardened Blade Assemblies
#122-202	Container, Stainless Steel
#122-203	Container Lid
#122-204	Bottom Gasket
#122-210	Waring Blender® with Exciter Gear and Pickup Cable
#152-64	Container, Glass (For Fracturing Fluids)
#164-42	Male Connector for Power Cable (230 Volt Only)

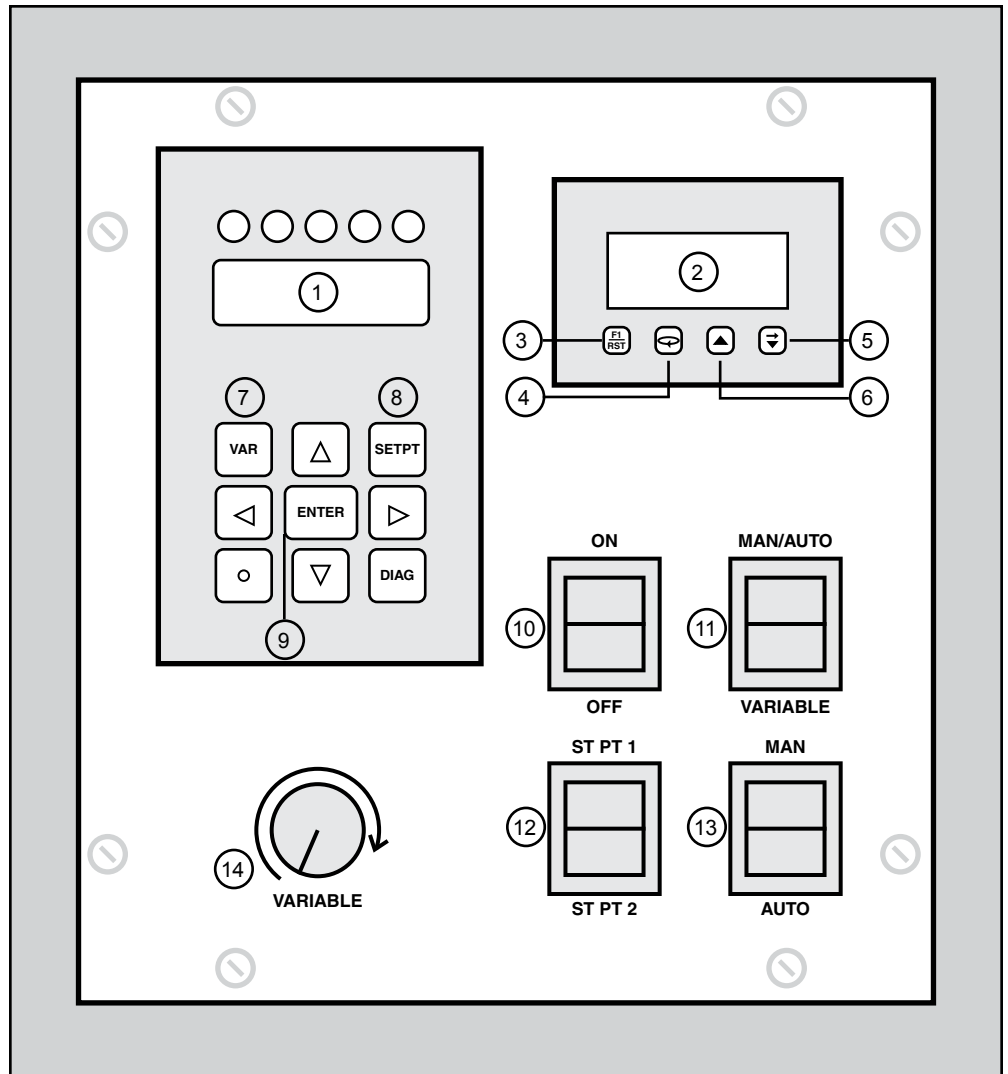
Optional:

### **#120-61 Spare Parts Kit, 115 Volt**

#122-075	Fuse, 7 Amp, 5 mm × 20 mm, Qty: 4
#122-077	Fuse, 10 Amp, 5 mm × 20 mm, Qty: 4
#122-200	Blending Assembly / Square Drive, 1 qt., Qty: 12
#122-202	Stainless Steel Container, 1 qt.
#122-203	Container Lid, 1 qt.
#122-204	Bottom Gasket, Qty: 6

## Specifications

- Hardened stainless steel mixing blades
- Stainless steel 1-liter mixing container
- Two preset mixing speeds and variable speed
- Maximum Speed for Cement Testing (120-60 / 120-60-1): 16,000 RPM
- Maximum Speed for Fracturing Fluid Testing (120-60-F / 120-60-1-F): 5,000 RPM
- Rotational speed is maintained at setpoint with microprocessor
- Timing relays automatically control mixing times at required RPM
- Digital instrumentation provides excellent readability
- Crated Size: 45" × 32" × 12" (114 × 81 × 31 cm)
- Crated Weight: Approximately 75 pounds (34.1 kg)



#### 1. Rotational Speed Display (RPM)

This display shows the speed of the blade. On models for cement testing (120-60 / 120-60-1), multiply the value displayed here by 10 to determine the actual RPM of the blade.

#### 2. Timer Display (Seconds)

#### 3. F1/RST / Reset the Timer

Press this button to reset the timer to zero.

#### 4. Enter / Enter Config Mode

Press this button to enter Config Mode and to select a setpoint to modify.

5. Down Arrow / Decrease Setpoint

This button decreases the setpoint value.

6. Up Arrow / Increase Setpoint

This button increases the setpoint value.

7. Keypad: VAR

This button accesses the PID Parameter Control Menu.

8. Keypad: SETPT

Press this button to change the rotational speed of Setpoint 1 or Setpoint 2.

9. Keypad: ENTER

Press this button to store the Setpoint value in memory.

10. Two-Way Switch: ON - OFF

This switch provides power to the unit.

11. Two-Way Switch: MAN/AUTO - Variable

This switch determines the operating mode of the unit. If it is set to MAN/AUTO, the MAN - AUTO switch (13) becomes active. If it is set to VARIABLE, the unit will be in Variable Mode.

12. Three-Way Switch: ST PT 1 / ST PT 2

This switch remains inactive unless the **MAN/AUTO - Variable** switch (11) is set to **MAN/AUTO** and the **MAN - AUTO** switch (13) is set to **MAN**. It toggles the rotational speed between Setpoint 1 and Setpoint 2. If it is in the center position, the unit will not rotate.

For testing Cement (part numbers 120-60 and 120-60-1), Setpoint 1 is 4,000 RPM and Setpoint 2 is 12,000 RPM. For testing Fracturing Fluids, Setpoint 1 is 500 and Setpoint 2 is 1,000 RPM.

### 13. Three-Way Switch: **MAN - AUTO**

This switch remains inactive unless the **MAN/AUTO - Variable** switch (11) is set to **MAN/AUTO**. It toggles the operating mode between Manual Mode and Auto Mode. If it is in the center position, the unit will not rotate.

### 14. Potentiometer

This knob remains inactive unless the **MAN/AUTO - Variable** switch (11) is set to **Variable**. It provides greater control over the rotational speed of the unit.

## ***Installation***

1. Carefully remove the unit from the packing box and place it on a counter safely away from sinks and other possible hazards.
2. Place the blending assembly on the base of the unit.
3. Plug the power supply cord into the port underneath the cabinet housing labeled "BLENDER".
4. Plug the transducer cable into the center port and fasten in place with the two clamps and screws provided. Do not over tighten.
5. Finally, plug the power supply cord into a suitable AC power supply.



# Operation

The blending assembly has two speeds, “HI” and “LO”. The Constant Speed Blender will not operate unless the blending assembly is set to “HI”. Before operation, press the “HI” button on the blending assembly.

The unit has three operating modes: Manual, Variable, and Auto. The **MAN/AUTO - Variable** switch (11) and the **MAN/AUTO** switch (13) set the mode.

1. To set the unit to Manual Mode, set the **MAN/AUTO - Variable** switch (11) to **MAN/AUTO** and the **MAN - AUTO** switch (13) to **MAN**.
2. To set the unit to Auto Mode, set the **MAN/AUTO - Variable** switch (11) to **MAN/AUTO** and the **MAN - AUTO** switch (13) to **AUTO**.
3. To set the unit to Variable Mode, set the **MAN/AUTO - Variable** switch (11) to **Variable**.



Important

**Before turning the unit on, be sure to set the MAN/AUTO switch (13) and the ST PT 1 / ST PT 2 switch (12) to the center position and turn the Potentiometer (14) fully counter-clockwise.**

# Operation

*Manual Mode*

1. Place the mix water into the mixing cup and place the lid on top of the container.
2. The **MAN/AUTO - Variable** switch (11) should be in the **MAN/AUTO** position. The **MAN/AUTO** switch (13) should be in the **MAN** position.
3. Place the **ST PT 1 / ST PT 2** switch (12) to the **ST PT 1** position to start the unit.



Note

**When you initially start the unit, the rotational speed may exceed the setpoint, but will stabilize within a few seconds.**

4. After stabilization, you have 15 seconds to add the cement to the mix water and cover the container with the lid. Reset the timer to zero by pressing the “F1/RST” button (3).
5. After 15 seconds, increase the rotational speed by setting the **ST PT 1 / ST PT 2** switch (12) to **ST PT 2**.
6. After mixing the cement an additional 35 seconds, stop the blender by setting the **ST PT 1 / ST PT 2** switch (12) to the center position.
7. Return the **MAN/AUTO** switch (13) to the center position.
8. After mixing is complete, clean the blending cup and lid as soon as possible to prevent any cement from building up on the container.

## Operation

### Variable Mode

1. Place the mix water into the mixing cup and place the lid on top of the container. Ensure that the potentiometer control knob is in the fully counter-clockwise position.
2. Make certain that the **ST PT 1 / ST PT 2** switch (12) is in the center position. Place the **MAN/AUTO - VARIABLE** (11) switch in the **Variable** position.
3. Increase the rotational speed of the blender by turning the control Potentiometer (14) clockwise.
4. Reset the timer to zero by pressing the “F1/RST” button (3).
5. After mixing is complete, clean the blending cup and lid as soon as possible to prevent any cement from building up on the container.

## Operation

### Auto Mode

1. Place the mix water into the mixing cup and place the lid on top of the container.
2. Make certain that the **ST PT 1 / ST PT 2** switch (12) is in the center position. Place the **MAN/AUTO - VARIABLE** switch (11) to the **MAN/AUTO** position. Place the **MANUAL/AUTO** switch (13) switch to the **AUTO** position.



Note

**Once the switch is placed into the AUTO position, the blender should start to accelerate. If the blender does not accelerate, reset the timer by pressing the “F1/RST” button (3).**

**When you initially start the unit, the rotational speed may exceed the setpoint, but will stabilize within a few seconds.**

3. After stabilization, reset the timer to zero again and immediately begin adding the cement. You have 15 seconds to add the cement to the mix water and place the lid on the container.



Note

**After 15 seconds the timer will automatically increase the rotational speed to Setpoint 2. Ensure that the cement is added to the mix water and that the lid is placed on the container in less than 15 seconds.**

4. After mixing the cement at Setpoint 2 for 35 seconds the timer will automatically stop the blender.
5. After mixing is complete, clean the blending cup and lid as soon as possible to prevent any cement from building up on the container.

## **Operation**

### *Timer*

The timer is continuously on whenever power is applied to the unit. The unit will measure elapsed time to its maximum value and then stop at setpoint 2.

By default, setpoint 1 is set to 15 seconds and setpoint 2 is set to 50 seconds. These values conform to the guidelines established in API Specification 10.

To change these values, do the following:

1. Press the Enter button (4) and hold it for two seconds.
2. Press the Enter button (4) repeatedly until the display reads "PrESET 1".
3. Press the Up (6) and Down (5) Arrow buttons to change Setpoint 1.
4. Press the Enter button (4) repeatedly until the display reads "PrESET 2".
5. Press the Up (6) and Down (5) Arrow buttons to change Setpoint 2.
6. Press the Enter button (4) and hold it for two seconds to save the new setpoints and return to the main screen.

## **Operation**

### *Speed Controller*

The Constant Speed Blender has two setpoints that are set at the factory. For Cementing testing, Setpoint 1 and Setpoint 2 are set to 4,000 and 12,000 RPM respectively. For Fracturing Fluid testing, they are set to 500 and 1,000 RPM.

To change these values, do the following:

1. Press "SETPT" (8) to activate the speed control menu.
2. Use the arrow keys to scroll to either "SETPOINT 1" or "SETPOINT 2".
3. Press "ENTER" (9).
4. Key in the numeric value (rotational Speed) of the new setpoint with the keypad.
5. Press "ENTER" (9) to store the new value into the controller's memory.

# Operation

## PID Parameters

For optimum performance, it may be necessary to change the PID parameters within the controller. To tune the controller, do the following:

1. Operate the unit in Manual Mode with a typical fluid within the container. Toggle between ST PT 1 and ST PT 2 and watch for over or undershoot. If there is significant overshoot access "VARIABLE 9" and reduce the value by 4.

To access "VARIABLE 9" press the "VAR" (7) key, press "9", and then press "ENTER" (9). Key in the new value and press "ENTER" (9) to store it into memory.

If there is no overshoot or undershoot, but the response was slow, increase the value of "Variable 9" by 4.

Repeat the above procedure, changing the value of "VARIABLE 9" until there is minimal overshoot and the ramp is smooth. Note that to fine tune the controller, the value can be incremented in steps of 1 or 2 and not necessarily a value of 4.

Variable 10 may be accessed and changed in the same manner.

2. Run the controller at ST PT 2. Increase "VARIABLE 10" by 4 and watch for any oscillations around the setpoint. If no oscillations occur increase "Variable 10" by 4 until oscillations begin.
3. After the onset of oscillations, reduce "VARIABLE 10" by 4.
4. Repeat steps 2 and 3 until minimal over and undershoot occur.

This is a trial and error process. After each change, record the setting and its result. Variable 9 and 10 are initially set to 10 and 8 respectively.

# Warranty and Return Policy

## Warranty:

OFI Testing Equipment, Inc. (OFITE) warrants that the products shall be free from liens and defects in title, and shall conform in all respects to the terms of the sales order and the specifications applicable to the products. All products shall be furnished subject to OFITE's standard manufacturing variations and practices. Unless the warranty period is otherwise extended in writing, the following warranty shall apply: if, at any time prior to twelve (12) months from the date of invoice, the products, or any part thereof, do not conform to these warranties or to the specifications applicable thereto, and OFITE is so notified in writing upon discovery, OFITE shall promptly repair or replace the defective products. Notwithstanding the foregoing, OFITE's warranty obligations shall not extend to any use by the buyer of the products in conditions more severe than OFITE's recommendations, nor to any defects which were visually observable by the buyer but which are not promptly brought to OFITE's attention.

In the event that the buyer has purchased installation and commissioning services on applicable products, the above warranty shall extend for an additional period of twelve (12) months from the date of the original warranty expiration for such products.

In the event that OFITE is requested to provide customized research and development for the buyer, OFITE shall use its best efforts but makes no guarantees to the buyer that any products will be provided.

OFITE makes no other warranties or guarantees to the buyer, either express or implied, and the warranties provided in this clause shall be exclusive of any other warranties including ANY IMPLIED OR STATUTORY WARRANTIES OF FITNESS FOR PURPOSE, MERCHANTABILITY, AND OTHER STATUTORY REMEDIES WHICH ARE WAIVED.

This limited warranty does not cover any losses or damages that occur as a result of:

- Improper installation or maintenance of the products
- Misuse
- Neglect
- Adjustment by non-authorized sources
- Improper environment
- Excessive or inadequate heating or air conditioning or electrical power failures, surges, or other irregularities
- Equipment, products, or material not manufactured by OFITE
- Firmware or hardware that have been modified or altered by a third party
- Consumable parts (bearings, accessories, etc.)

## Returns and Repairs:

Items being returned must be carefully packaged to prevent damage in shipment and insured against possible damage or loss. OFITE will not be responsible for equipment damaged due to insufficient packaging.

Any non-defective items returned to OFITE within ninety (90) days of invoice are subject to a 15% restocking fee. Items returned must be received by OFITE in original condition for it to be accepted. Reagents and special order items will not be accepted for return or refund.

OFITE employs experienced personnel to service and repair equipment manufactured by us, as well as other companies. To help expedite the repair process, please include a repair form with all equipment sent to OFITE for repair. Be sure to include your name, company name, phone number, email address, detailed description of work to be done, purchase order number, and a shipping address for returning the equipment. All repairs performed as "repair as needed" are subject to the ninety (90) day limited warranty. All "Certified Repairs" are subject to the twelve (12) month limited warranty.

Returns and potential warranty repairs require a Return Material Authorization (RMA) number. An RMA form is available from your sales or service representative.

Please ship all equipment (with the RMA number for returns or warranty repairs) to the following address:

OFI Testing Equipment, Inc.  
Attn: Repair Department  
11302 Steeplecrest Dr.  
Houston, TX 77065  
USA

OFITE also offers competitive service contracts for repairing and/or maintaining your lab equipment, including equipment from other manufacturers. For more information about our technical support and repair services, please contact [techservice@ofite.com](mailto:techservice@ofite.com).