

Type: Manual Cellumatic

Model Number:

Serial Number:

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Owner's Manual
For
Strong Manufacturing Company
Manual Cellumatic

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Preface

The Manual Cellumatic is designed to generate foam continuously, without the use of pressure vessels.

The Manual Cellumatic offers a choice of three different power units, making it an extremely versatile machine. These options are:

1. Hydraulic Motor
2. Gasoline Engine
3. Electric Motor

Each machine will vary slightly in operation procedures depending on your choice of power unit. The power unit drives a gear pump that supplies the foam solution to the nozzle. Foam density is easily varied by changing either the solution pressure or the air pressure applied to the mixing blocking.

There is a separate section in this manual which contains specific safety information. No one should be permitted to perform any function on the machine unless he or she has at least read the safety section of this manual. The safety section is also available free of charge to owners of Manual Cellumatics as a separate pamphlet by writing the Strong Manufacturing Company, P.O. Box 8068, Pine Bluff, Arkansas, 71611.

Following the Preface there are descriptions of the components of the machine, its operation, and maintenance information. In order to help you properly service and care for the machine, the operation and maintenance manuals from the various suppliers of components are included. These should be carefully read and followed by those who will be responsible for maintenance of the machine. The information given will help you obtain the best performance from the machine.

Safety

A. Machinery

1. Read this manual and all component manufacturers' manuals before operating the machine or performing maintenance.
2. Read all WARNING and CAUTION signs before starting the machine.
3. Make sure that all guards are in place before starting motor or engine.
4. Never remove a guard with the machine running. Always stop motor or engine, then disconnect electric power of spark plug cable (gas) before removing a guard of performing any maintenance. Never make repairs or adjustments with the machine running.
5. Never operate machine with worn or loose parts. Make necessary repairs or adjustments promptly.
6. Watch gauges and never operate machine at excessive pressures. Replace malfunctioning gauges immediately.
7. Never apply air or fluid pressure to solution tank.
8. Never point nozzle at anyone or look into nozzle.
9. If nozzle plugs (gauge after mixing block goes above 65 PSI), carefully remove it from hose and clean it with warm water. Inspect nozzle for obstructions before reconnecting it to hose.
10. Inspect from hose daily and replace worn or damaged hose with hose rated at least 125 PSI at a 2:1 safety factor or greater immediately.
11. Do not wear loose clothing near the machine.
12. Always disconnect electric power or spark plug cable (gas) when not in use to prevent unauthorized starting.
13. Always keep a working, fully charged fire extinguisher near the machine.

14. Fill with fuel before starting and allow engine to cool before refueling. Never pour fuel into a hot engine. Avoid spillage and soak up any spillage that does occur immediately. If no absorbent is available, use cementitious material. Remove absorbent or material used to soak up spillage from area and wash machine before starting engine.
15. Never spray water onto electric motor, electric switches, or a hot engine. Disconnect electricity before wash up.

B. Water

1. Never connect water to machine when line pressure is over 125 PSI.
2. Always flush water lines prior to connecting to machine as damage to the solution pump will result if sand or other foreign particles get into the tank solution.
3. Use only potable water.
4. In cold weather, disconnect water from machine and drain solution tank, pump, and lines after each use. The machine may be drained by unscrewing the Y-strainer and opening the petcock on the solution pump. Leave drains open.
5. Inspect solution hoses daily and replace worn or damaged hose with hose rated 125 PSI or more at a 2:1 or greater safety factor.

Caution: Failure to observe the above warnings can result in severe bodily injury, including loss of limbs, eyes and possibly death.

C. Air System

1. Do not exceed 125 PSI maximum line pressure at machine.
2. All air hoses should be rated 125 PSI or more with at least a 2:1 safety factor.

3. Inspect all air hoses daily. Any worn, cut or damaged hose should be replaced immediately.
4. Prevent kinks in air hose. Kinks reduce air supply and cause structural damage to hoses.
5. Drain air filter after each use to prevent freeze damage or injury from flying ice crystals.

Caution: Failure to observe the above warnings can result in severe bodily injury, including loss of limbs, eyes and possibly death.

Components

The location of the Manual Cellumatic components can be seen in drawing [86000513](#). Also refer to the Power Train drawing. The number of the Power Train drawing will be determined by the power unit chosen. For gasoline powered Cellumatic, use drawing [86000591](#).

A. Fluid System

The solution of water and foaming agent is drawn from the bottom of the solution tank through a suction strainer to the solution pump (See drawing [86000589](#)). The pump forces the solution into the mixing block, where the solution is mixed with air. The pump will be damaged if allowed to run dry.

B. Air System

Air must be supplied to the machine from an external compressor (not included) of at least 50 CFM capacity. The compressor must be set to not exceed 125 PSI. The machine should be connected to the air supply by a 3/4" I.D. or larger hose rated for at least 125 PSI at 2:1 or greater safety factor. A built-in air pressure regulator controls the air flow rate to the mixing block. (See drawing [86000589](#)).

C. Nozzle

The nozzle supplied should produce approximately 240 GPM of foam depending on foaming agent and pressure settings.

D. Power Unit

The Manual Cellumatic is supplied with a choice of power units. The power are:

1. Hydraulic motor with 12v D.C. controls
2. Gasoline engine with 121v D.C. controls

3. Electric motor with 120/240v A.C. controls

Operation of the machine will vary slightly depending on your choice of power unit. Details are covered in the “Operations” section of the manual.

E. Control Box

The control box controls the operation of the pump and the Asco valve. The Asco solenoid valve controls the flow of foam solution to the nozzle. The “auto to manual” switch that is located on the control box changes the operation from automatic to manual control. While set on “auto”, foam is output for a set amount of time. This is accomplished by use of a timer that ranges from 1 to 300 seconds. While set on “manual”, foam is output continuously. The “off” selection on the switch stops the operation of the machine at any time. The complete operation of the Manual Cellumatic can be controlled with the control box. See drawings 86000588 and 86000587.

NOTE: Only electricians or persons with electrical experience should be allowed to fix electrical problems should the arise.

F. Solenoid Valve

This valve controls the flow to the nozzle. It is located on the mixing block discharge. When energized, the valve allows flow to the nozzle. The gasoline engine has another solenoid valve that controls the speed that the engine runs. When activated, this valve opens allowing air to move a pneumatic cylinder. The motion of the cylinder engages the throttle.

Operation

A. Machine Ser-Up (All Power Units)

1. Connect the machine to a 50 CFM or larger air compressor (not included). Use a ¾" ID or larger air hose rated for at least 125 PSI with at least a 2:1 safety factor. Air compressor must be set not to exceed 125 PSI.
2. Connect 1" I.D. or larger hose to the nearest water source for filling the solution tank. Larger hose diameters will increase water flow when using long hose runs or low-pressure water sources. Never connect hose to a water source that is at a pressure higher than 125 PSI. Always use hose rated for a pressure higher than the pressure of your water source with at least a 2:1 safety factor.
3. Fill the solution tank with water and foaming agent in the ratio recommended by the foaming agent manufacturer. Solution may be mixed in a bucket and poured into solution tank. Alternately, mixing may be done in the solution tank using the optional air operated mixer. Always fill the tank with the Cellumatic power source off. Failure to do so may vary foam density.
4. Couple the foam nozzle to the foam hose and couple the hose to the machine.
5. (Engine Powered Units) Check engine oil level and add oil as recommended by the engine manufacturer (see enclosed engine manufacturer's manual). Fill fuel tank (see Machinery part of Safety section). Use only high octane (93) gasoline. This will prevent from bogging down or stalling as the engine RPM is varied instantaneously.
6. (Electric Powered Units) Switch off electric motor and then plug in electric cord. Avoid long electric cord runs.

B. General Operation and Cleaning

Always make sure all hose couplings (foam nozzle, foam, air and water) are securely fastened before starting the machine.

Set the timer (see manufacturer's manual) to foam delivery time required per batch if mux for your application. The time required per batch will depend on: total volume, percent foam desired

in batch, and the foam delivery rate if your machine (varies with regulated air pressure setting and varies slightly from one machine to another). Check solution tank level, solution pump pressure, supply air pressure, and regulated air pressure frequently during operation. Solution pump pressure will be proportional to regulated air pressure, but less than 95 PSI (see Factory Settings section).

The regulated air pressure should be approximately 88 PSI (see Factory Settings section). If more air pressure is used, the foam density will decrease and volume output will increase. If less air pressure is used, the foam density will increase and volume will decrease.

At the end of each day the system should be cleaned out. It is not necessary to flush solution tank if system is to be used within 72 hours and freezing is not expected. Don't let system freeze. To flush pump and nozzle, drain tank and refill with clean water. Pump this water thru system. Nozzle must be flushed at the end of each day to prevent build-up. Nozzle may be flushed out both air and water lines before attaching to machine.

C. Foam Generation with Gasoline Engine

The engine speed has been factory set at 2650 RPM. This drives the pump at 1450 RPM. If pump speed is increased, the foam density will increase with very little increase in output volume. If pump is slowed down, the foam density decreases, producing an unstable foam.

Allow engine to warm up at an idle. Engine to pump drive is thru a centrifugal clutch. Idle RPM should be set so that the pump is on the verge of turning. Liquid must be in solution tank to avoid solution pump damage. When start switch on timer is pressed, an air cylinder linked to the carburetor causes the engine to speed up, engaging the centrifugal clutch driving the pump. At the end of the timed cycle, the air cylinder retracts slowing the engine back to an idle, which disengages the centrifugal clutch. The timer "start" button causes an Asco solenoid valve at the mixing block discharge to open simultaneously with starting of the pump. The nozzle mixes the combination of air and liquid discharged from the mixing block into millions of tiny air bubbles to produce a uniform density. Of the ratio of liquid to air changes, both the density and amount of foam delivered will change. The engine speed, pump by-pass pressure and regulated air have been factory set. The settings may need adjustment depending on the brand of foam solution used in the machine.

D. Standard Checks

Checks to make prior to operation:

1. All connections mentioned are made correctly
2. Mixture tank is full and well mixed
3. Nozzle connected
4. Asco valve plugged in
5. Timer set on time needed for foam production

Checks to make while operating:

1. Pump pressure is at calibrated pressure (see Factory Settings section)
2. Level of mixture tank does not get below outlet
3. Air pressure stays at the calibrated pressure (see Factory Settings section)
4. Back pressure lower than 65 PSI

E. Foam Generator Calibration

1. Connect the remote control to the foam generator (make sure the switch is in the off position)
2. Start the engine and allow it to set at idle for at least for at least five minutes before performing any type of calibrations.
3. Fill the solution tank; make sure the solution tank has the proper water to foaming agent ratio as recommended by the foaming agent manufacturer.
4. Connect the foam generator to your air source (the air source must be capable of producing at least 50 cfm, and air pressure and not to exceed 125 PSI) at this point adjust the main air pressure regulator (A) to 80 PSI this can be verified by reading the gauge (B). If the air pressure is greater or less than 80 PSI it can be adjusted by turning the knob on the regulator.

By turning the knob in a clockwise motion, the air pressure will increase, turning the knob in a counter clockwise motion will lower the pressure. If high air pressure is used the foam density will decrease and the volume output will increase, if low pressure is used the foam density will increase and the volume output will decrease.

5. Connect foam nozzle to machine via supplied hose.
6. With all of the above procedures verified, move selector switch on remote from the off position to manual at this point the engine rpm should increase and the solenoid valve operating the foam nozzle should open and you should be able to see foam exiting the end of the foam nozzle. Now look at gauge (C) mounted on top of the solution pump it should at least 90 PSI, if it doesn't this pressure could be adjusted by resetting the relief on the solution pump. The pressure on the solution pump must be adjusted with the machine running in the manual mode, with the pump running remove cap (D) and loosen the jam nut (E) by turning the adjustment screw in a clockwise motion the pressure will increase, by turning it counter clockwise the pressure will decrease. Once the pressure has been adjusted to the proper setting the jam nut (E) should be tightened and the cap (D) reinstalled.

The above settings are what we have found to work well with Elastizell products.

Example:

Air pressure to mixing block = 80 psi (B)

Solution pressure to mixing block = 90 psi (C)

Back pressure at nozzle = 50 psi (F)

Density of foam = 2.8 lbs per cubic foot

Foam output = 250 gpm

Air pressure and solution pump pressure settings will vary from one foam manufacturer to another, this is just a guide to get you started in calibration.

Trouble Shooting

Problem: No flow at nozzle

Probable Cause	How to Determine	Solution
Nozzle plugged.	Pressure gauge between mixing block and nozzle is above 65 PSI.	Clean or replace nozzle.
Asco Valve malfunctioning.	With pump running, check pump pressure gauge. Valve is not opening if gauge registers pressure.	Replace valve or restore electrical signal to valve.
Pump malfunctioning.	With pump running, no (or very low) pressure registers on pump gauge.	Repair or replace pump.
Solution Tank empty.	Check fluid level in tank.	Fill tank. (Pump may have been damaged. Check pump pressure after filling tank.)

Problem: Foam not at the correct density

Probable Cause	How to Determine	Solution
Incorrect air pressure setting.	Compare air pressure reading to desired pressure (see Factory Settings section).	Change setting on regulator.
Incorrect foaming solution pressure.	Compare solution pressure reading to desired pressure (see Factory Settings section).	Adjust pump pressure setting.
Incorrect water to foaming agent ratio.	Compare ratio used to foaming agent manufacturer's recommendation.	Change solution.

Note: If none of the preceding solves problem, contact Strong Manufacturing Company, Inc.

Trouble Shooting

Problem: Foam not at the correct density. (Continued)

Probable Cause	How to Determine	Solution
Brand of foam has changed,	Foam is not the same as what the machine was calibrated for.	Send 2 gallon sample of foam concentrated to Strong Mfg. for calibration.

Problem: Small amount of fluid discharged from nozzle instead of foam.

Probable Cause	How to Determine	Solution
No air flowing to machine.	Air pressure gauges registering zero PSI.	Repair air compressor.

Problem: Electric Motor will not operate.

Probable Cause	How to Determine	Solution
Incorrect supply voltage.	Check motor requirements and check supply voltage.	Connect cord to proper electric outlet.
Excessive voltage loss in electric load.	Check voltage at the machine.	Consult electrician for proper wire size.

Note: If none of the preceding solves problem, contact Strong Manufacturing Company, Inc.

Manual Drawing List

Drawing Number	Description
86000513	Manual Foam Generator
86000587	Electrical Components – Front Panel
86000588	Control Box – Gas Powered
86000589	Plumbing Components
86000591	Power Train Assembly