

**VF-100
VOLUMETRIC FEEDER**

Installation and Operation

MANUAL

Revision 4, 8/10/09

SERIES VF-100 SCREW FEEDER

FOREWORD

Eagle Microsystems began in the 1960's as a manufacturer's representative for weighing components. By the 1970's the company had transformed itself into a manufacturer of both electronic and mechanical weighing components with emphasis on the municipal marketplace in the water and waste water treatment , where light weight, corrosion resistant and both duty and standby sources of chemicals were required. Eagle Microsystems provides a full line of vertical and horizontal cylinder, carboy, drum, and tank scales.

Today Eagle Microsystems in its endeavor to expand its product line is providing dry material volumetric feeding equipment with wetting cones and solution tanks to provide its customers with basic systems along with its line of weighing components.

For more information on Eagle products, visit the company's web site at

www.eaglemicrosystems.com

SERIES VF-100 SCREW FEEDER

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SCHEMATIC, FEEDER WITH MIXER

E-10240

INTRODUCTION:

The **EAGLE MICROSYSTEMS** Series **VF-100** is a dry material volumetric screw feeder designed to handle powdered and small granular material at feed rates from 0.002 to 65 cu feet per hour, utilizing 3/4 to 3" diameter stainless steel helical screws. The screws are direct driven by a DC gearmotor and SCR motor controller. The VF-100 is designed to operate in a hostile environment, where dusty, abrasive, and corrosive materials are handled. All material contact surfaces are stainless steel except for units with side wall pulsing or rocking agitation where high strength Neoprene or Buna N/Vinyl hopper side wall liners are utilized. The VF-100 is available in two hopper configurations. The first is the sidewall rocking motion where, a rocker arm assembly is driven from an eccentric mounted on the feeder drive shaft. This motion rocks plates under the flexible membranes in the side walls of the hopper, which prevents material arching across the hopper. In this arrangement the rocking action is directly proportional to the screw speed. The second configuration utilizes solid S.S. side walls in the hopper. An electro-mechanical vibrator attached to the outside of the hopper wall is periodically energized for short periods of time to prevent arching. This method of agitation is independent of the screw speed, and both the ON and OFF times can be independently adjusted.

I. PRE-INSTALLATION INSTRUCTIONS:

A. RECEIVING:

The **EAGLE MICROSYSTEMS** Series **VF-100** dry material volumetric screw feeder is normally shipped via motor freight as a complete assembly bolted to a skid package.

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If an adjustable mounting stand assembly is provided, the feeder is generally mounted to the stand and the stand bolted to the skid package. Other accessories, such as solution tanks, weigh platforms, extension hoppers, etc. will be bolted to skid package(s) as required. To minimize potential shipping damage, controllers are shipped separately via parcel service. Upon receipt of the skid package(s) from the common carrier, inspect the package(s) for damage. All components should be securely mounted to the skid(s). If a component has broken loose or the skid is damaged, check for component damage. If the package itself is damaged, the contents may likewise be damaged. If damage is evident, open the package immediately and check the contents. If damage is evident, notify the carrier for credit and **Eagle Microsystems** for repair or replacement of the equipment.

Note: If the package is damaged and no physical damage to the equipment is apparent, write on the carrier's paperwork "PACKAGE DAMAGED" to protect your rights to collect for possible future discovered damage at startup. **EAGLE MICRO-SYSTEMS WILL ONLY REPAIR OR REPLACE DAMAGED GOODS FREE TO THE CUSTOMER FOR MATERIAL REIMBURSED BY THE CARRIER.**

B. STORAGE:

If the equipment is not to be installed upon arrival at the job site, it is best to leave the feeder mounted to its shipping skid indoors until such time as the feeder is ready to be installed. If the temperature in this storage area is such that condensation may develop in the drive controller package, the electronics package should be moved to a temperature controlled environment. For extended storage, Eagle recommends that delivery of the electronics be scheduled a week or so prior to the scheduled installation date. The feeder should remain in its original packaging until installation.

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C. LOCATION:

The feeder should be installed in an area which is clean and dry and without excessive drafts that will blow fine material into the air. This will prevent a dusting problem that would be detrimental to both personnel and other equipment in the area. Damp locations can cause some materials to absorb moisture. This can affect the handling properties of the material causing difficulties in feeding the material.

D. UNPACKING:

Remove all strapping and packing material from the feeder assembly. If furnished with a scale, remove the shipping spacers from beneath the scale plate and lower the scale so that the leveling feet are resting on the feeder stand.

II. INSTALLATION INSTRUCTIONS:

Move the feeder assembly to the desired location and orientation. Level the feeder stand and bolt it down. The stand height is pre-adjusted at the factory. However, should height adjustment be necessary it can be accomplished in the field with ordinary hand tools.

Once the feeder assembly is in place, remove the four (4) 1-inch long x $\frac{1}{4}$ -20 hex bolts from the leveling feet, and install the four (4) $\frac{5}{8}$ -inch long x $\frac{1}{4}$ -20 hex bolts into the shock mount. Adjust the leveling feet of the scale from the under side of the feeder stand platform. **DO NOT OVER-TIGHTEN!** These screws are only to keep the scale from moving on the stand. If tightened completely they will apply load to the load cells, and this will result in inaccurate scale measurements.

On installations where the customer has chosen not to purchase a mounting stand from **Eagle Microsystems**, the customer must provide a mounting stand. The stand must be rigid, flat and level. The stand should be large enough to support the feeder

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base and have mounting holes drilled to match the bolt pattern of the feeder. If a weigh plate is provided, its platform must be located in the correct location and at the correct height and be level. Other accessories such as a solution tank must be properly located in reference to the feeder, while accessories such as an extension hopper only have to be bolted into position atop the feeder. On some convenient structure close to the feeder locate and drill holes for mounting the motor drive controller. This location should be within a 20' cable run of the feeder. If the controller must be located at longer distance from the feeder a junction box and cable extension box will have to be provided (by others). Wire the drive controller in accordance with the National Electric, Code, State and Local regulations. See wiring diagram provided with the feeder for basic feeder to controller connections.

III. STARTUP:

A. CHECK SCREW ROTATION:

Once the wiring is complete and before material is added to the feeder hopper, check the rotation of the drive screw to make sure the screw is rotating in the correct direction. Start the feeder and look into the feeder hopper to observe the screw flight. If the flight appears to be advancing toward the discharge spout, the screw is rotating in the correct direction. If you are not sure, drop a small amount of material (enough to cover the flight) in the center of the feeder hopper and observe which way the flight draws the material. If the material moves toward the discharge spout, all is well. If the material moves toward the drive end of the screw, the flight is rotating backward. **Rotating backward will unscrew the flight assembly from the drive shaft.** Stop the motor, remove AC power from the SCR controller and reverse the two armature wires connected to the SCR terminals. If the wiring reversal is required, check that the screw is fully threaded into the drive shaft, re-apply power to

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the SCR, start the motor and check the rotation again. Once the rotation has been proven to be correct and the screw is fully secured to the drive shaft, you are ready to fill the hopper with material.

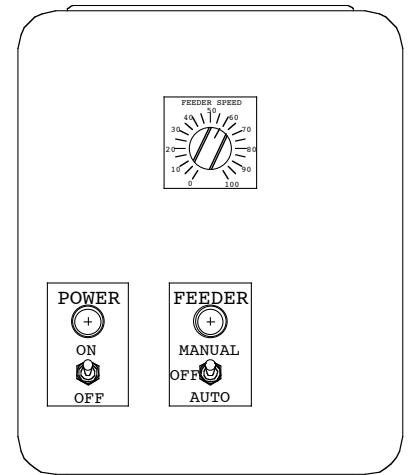
B. DETERMINE ACTUAL FEED RATES:

Actual feed rates vary in accordance with material density, material flow characteristics and ambient environmental influences. For accurate results it is important that you determine the actual feed rates you can expect at different settings of the speed potentiometer and, in the case of a feeder equipped with the remote analog speed control option, different control input levels. This is best accomplished with an accurate portable scale and a timing device. Recording the weight of material fed over a reasonable period of time at various settings will allow you to develop a very accurate feed rate table for your particular conditions.

C. OPERATION:

The basic VF-100 controller consists of the following controls:

- 1 **POWER ON/OFF SWITCH:** Switches main power to the controller, feeder drive motor and any optional device powered from the controller.
- 2 **FEEDER MANUAL/OFF/REMOTE SWITCH:** The "MANUAL" setting allows local operation of the feeder drive motor via the controller mounted speed dial. The "OFF" setting disconnects power to the feeder drive motor. The "REMOTE" setting allows the feeder to start/stop from a remote RELAY contact supplied by the customer.
- 3 **FEEDER SPEED DIAL:** Controls feeder speed as a percentage of full rated speed.



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Other auxiliary switches and controls may be provided for optional equipment such as solution tank mixers and hopper vibrator systems. When necessary, the operation of these optional devices is covered in an addendum to this manual.

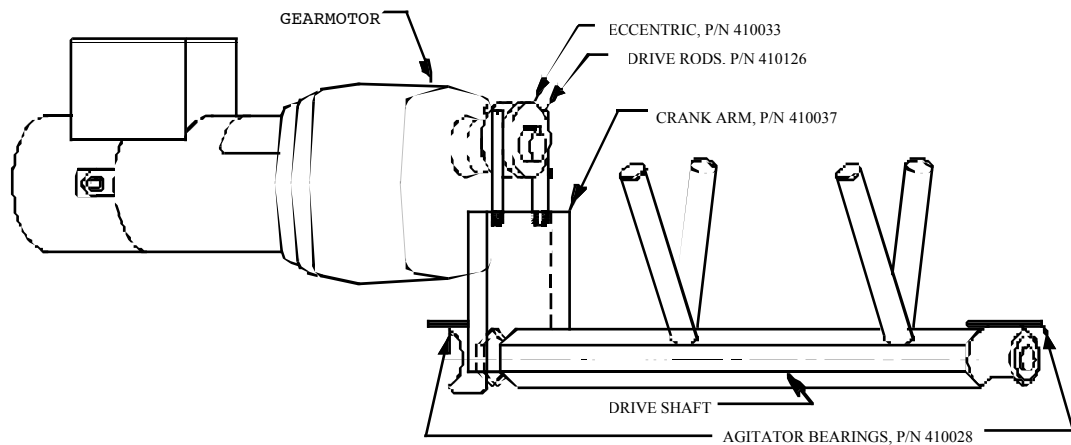
IV. MAINTENANCE:

Drive: All bearings and critical drive components are sealed and require no periodic lubrication. The drive hub assembly, located on the drive side of the feeder hopper, houses the sealed bearings that support the screw flight and the seal that prevents the material from migrating from the inside of the hopper to the bearings. The seal packing will wear over time and should be monitored and replaced when worn out to prevent damage to the bearings. Periodically check for packing failure by removing the drive guard and observing the “weep hole” on the underside of the hub assembly. If chemical is observed in the hole or piled beneath it, replace the packing. During routine maintenance shutdowns, empty the hopper and observe the packing. If there is less than 1/8” of white packing material visible, replace the packing. Unscrew the feed screw and the packing flange. The spring loaded seal housing should come out of the hub. Remove the teflon packing material, replace it and reassemble with a new seal O-ring in the hub. If the material has penetrated the inside of the hub assembly and bearings, wash them out and then check the bearings for run out and play. If in doubt, replace the bearings, or if the bearings seem OK, re-assemble the drive hub.

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Agitator Eccentric (Flexible wall agitation option only): The agitator eccentric is mounted to the motor shaft behind the drive coupling. It is subject to wear and should be checked as part of a preventive maintenance routine. To check the eccentric, remove main power from the feeder controller. Remove the drive guard. If more than 1/8" free play side to side is observed between the eccentric and the follower "Fingers", replace the eccentric

Hopper Membrane (Flexible wall agitation option only): Inspect the membrane from time to time for splitting or brittleness. Replace as required.



AGITATOR DRIVE ASSEMBLY, FIG-3

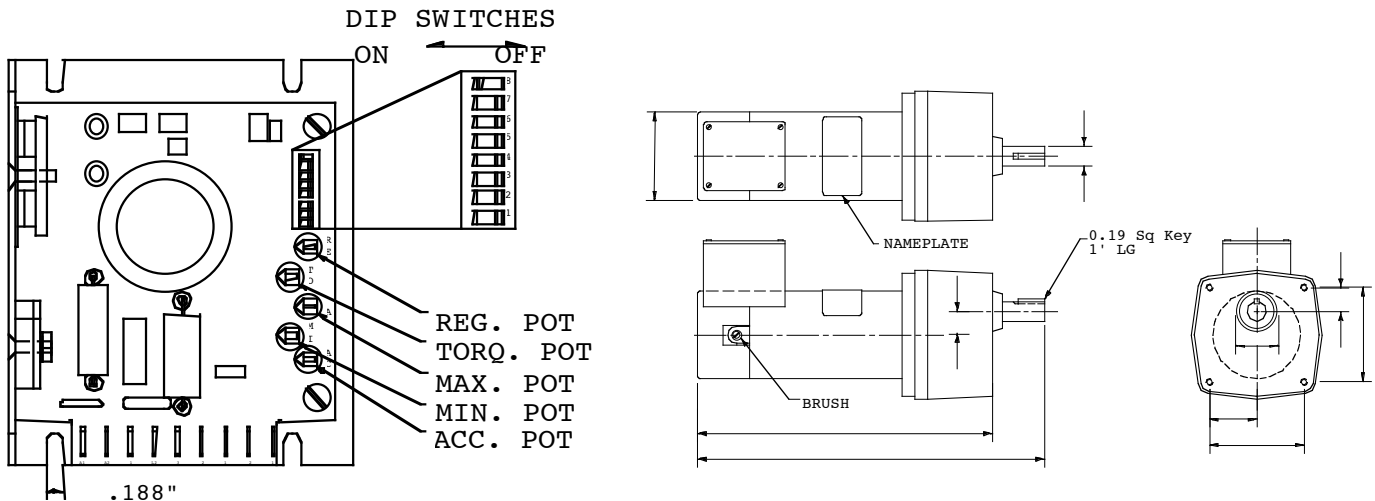
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V. PARTS:

The feeder parts consist mainly of fabricated stainless steel parts, which **Eagle Microsystems** either stocks or has made to order. A request for a specific part will enable us to determine the status of the part. Some parts such as the SCR motor controller, gear motor, bearings and hardware are commercial parts we stock and are available from authorized distributors.

SPARE PARTS:

| | | | |
|--------------------------|----------------------------------|----------------------|------------|
| Feed Shaft Seal O-Ring: | P/N 400383 | Screws: | |
| Feed Shaft Packing: | P/N 410013 | 3/4" solid: | P/N 410100 |
| Feed Shaft Spring: | P/N 410012 | 1 1/2" open: | P/N 410150 |
| Hopper Membrane: | P/N 410032 | 1 1/2" solid: | P/N 410108 |
| Hub Bearing (2 per hub): | P/N 410028 | 2 1/2" open: | P/N 410128 |
| Agitator Eccentric: | P/N 410033 | Eccentric Drive Rod: | P/N 410126 |
| SCR Controller: | P/N 413006 | | |
| DC Gear motor: | P/N 41300X (specify motor speed) | | |



SCR CONTROLLER, FIG 4

| REVISED | | | |
|---------|------|----|---------|
| NO. | DATE | BY | REMARKS |
| 1 | | | |
| 2 | | | |
| 3 | | | |
| 4 | | | |

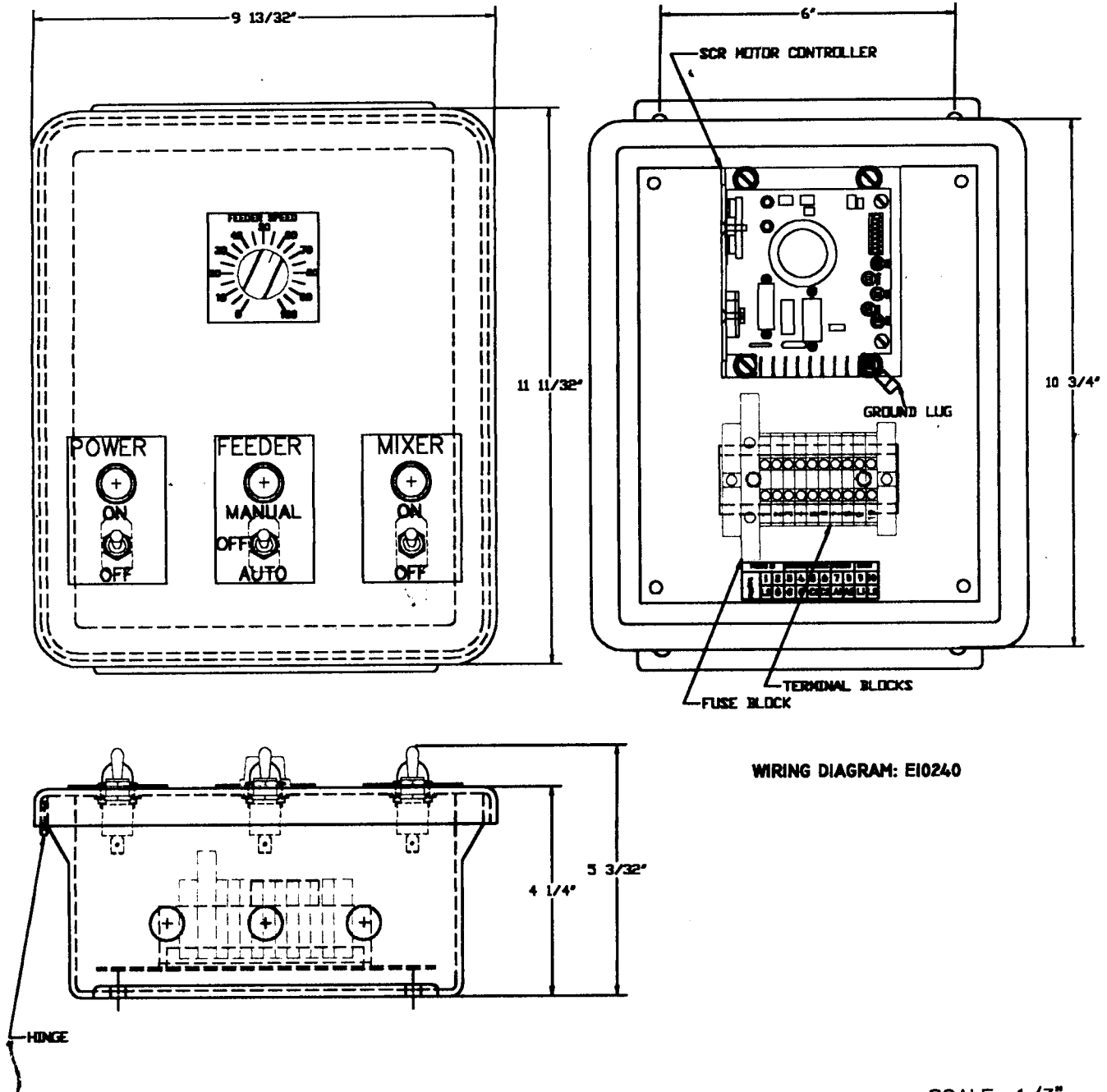


EMS-128

SKETCH No. _____

S. O. No. _____

FEEDER DRIVE ENCLOSURE ASSEMBLY WITH MIXER



WIRING DIAGRAM: E10240

SCALE: $\frac{1}{32}$ " = 1"

TOLERANCE, UNLESS STATED OTHERWISE: DIMENSIONS: FRACTIONAL: $\pm 1/32$ ", DECIMAL: $\pm .010$ "; ANGLES: $\pm 0.5^\circ$.

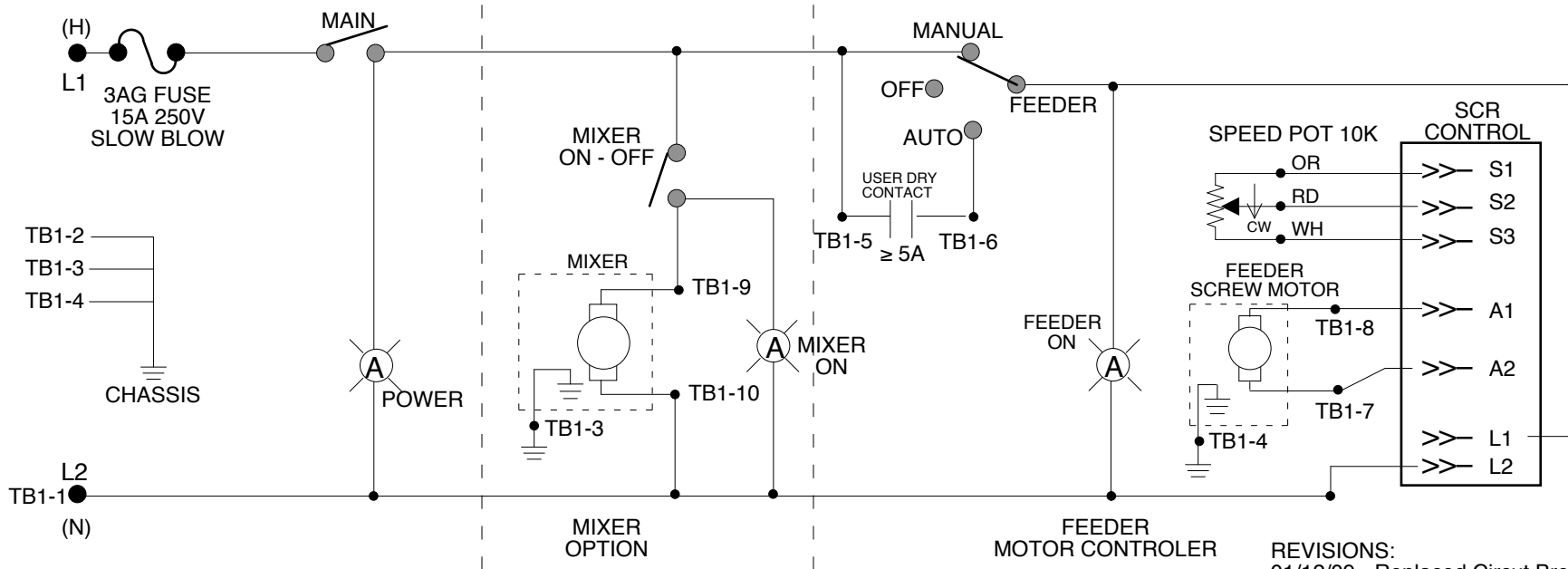
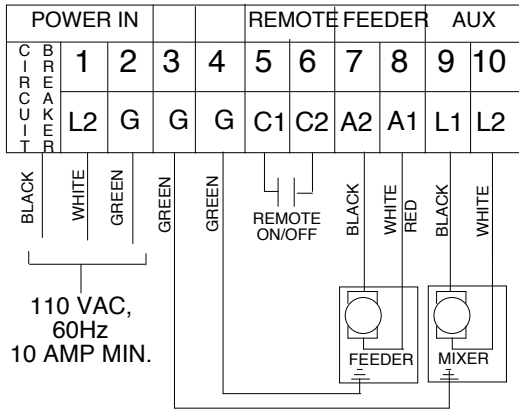
ASSEMBLY
ASS'Y

DRAWN:
F.H.W.

DATE:
10/16/02

CHECKED:

DATE:



NOTE: Alternate Remote Power Without Dry Contact
 1- Connect:
 TB1-6 to HOT
 TB1-1 to NEUTRAL
 2- Place Feeder Switch to AUTO

REVISIONS:
 01/12/09 - Replaced Circuit Breaker With
 3 Amp Fuse
 3/13/07 - Replaced Fuse with 10 AMP
 Circuit Breaker
 5/6/08 - Flipped A1 to Terminal #8 & A2 to
 Terminal #7

EAGLE MICROSYSTEMS
 366 CIRCLE of PROGRESS POTTSTOWN, PA 19464

**VF100 REMOTE
 CONTROL SCHEMATIC**

DRAWN BY: LJS DATE: 11/06/01 **E10240**