

# **Ploog Engineering Co., Inc.**

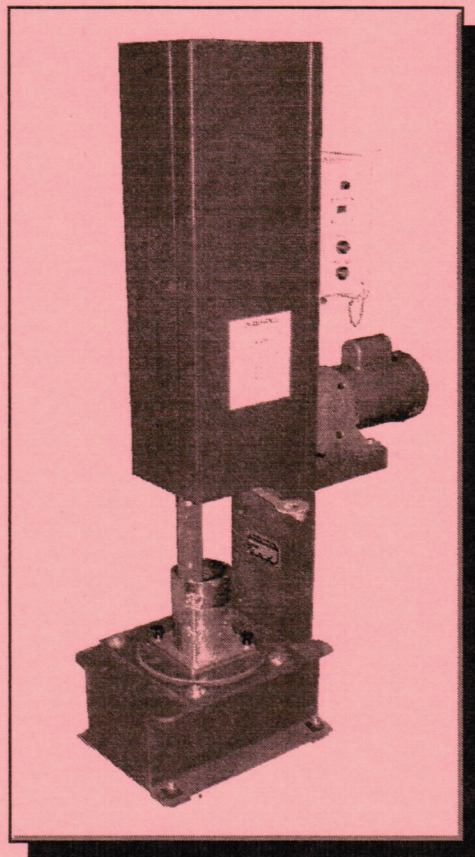
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Crown Point, IN 46307 USA  
219-663-2854

**Owner / Operator Manual for M100-3 Compactor**  
ASTM D698 & D1557, AASHTO T99 & T180

## **SAFETY REMINDER**

Please read these instructions thoroughly to become familiar with the operation of the machine, before attempting to run it.

The machine will not operate with the doors open.  
It has an electrical door interlock.



**INSTRUCTIONS FOR  
MECHANICAL COMPACTOR M100-3  
ASTM D698 & D1557, AASHTO T99 & T180  
Starting with Machine No.M100-302143692**

**It is very important that these instructions be read to become thoroughly familiar with the operation of the Machine before attempting to run it.**

The mechanical Compactor more closely duplicates hand compaction methods. It is suitable for Standard or modified Proctor compaction tests with adjustment for 12" or 18" drop and accommodating 4" or 6" inside diameter molds. Test results show that the Ploog Compactor can give results within 1% when compared with hand compaction and a 4" mold.

It is recommended for this compaction machine to be bolted to a concrete floor or mounted on a concrete base. We recommend a base approximately 15" wide x 24" deep x 12 to 18" high. The machine should be firmly bolted in place. The bolt holes are 10-5/8" centers in width, 14-1/2" centers in depth. The machine should be set level, checking that the turntable is level in both directions.

**A 20 Amp Receptacle with an On-Off Switch must also be provided by User.**

**Machine must be turned off when not in use.**

**This machine will not operate with the doors open.**

One of the hammers, which are packed separately for shipping, should be inserted into the Hammer Cage, the round type for the 4" mold or the pie foot for the 6" mold. In order to perform this operation proceed as follows:

1. Place a mold on the turntable. A 1/4" diameter pin extends from the center of the turntable. After locating the mold in position bolt same down to the table. Two sets of holes are located on the turntable for mounting the 4" & 6" molds.
2. Remove the front cage bar by pulling down the spring loaded retaining pin on top of same and lift out. Insert the hammer with foot down in to the hammer cage from the front of the machine. Slide the hammer down slow. DO NOT DROP, taking care not to trap fingers. Replace front cage bar. Close hinged cover and secure latch.
3. The hammer can now be lifted by manipulating the jog switch, until it is high enough to swing the hammer safety device under the hammer opening, the soil can be added to mold.
4. Whenever a mold is being changed or inspected, run the hammer up in the machine by means of the jog switch. Then swing the hammer safety arm, painted yellow, under the hammer opening. If the hammer should float down from its own weight, it will come to rest on the safety device. When ready to proceed with the testing, just jog the hammer up and swing the safety arm out of the way to the right.

## OPERATION

### For Compaction with a standard Mold, 6" inside Diameter.

Place the first layer of soil in the mold and place the mold in position on the turntable and clamp tightly. The height change cam should be in the top position for 18" drop. (See height change cam instructions). Set the pre-determining counter to 54. (See instructions for pre-determining counter). This will insure that 55 blows are struck, at the end of said number, the machine will automatically stop. Press the green start button on the right hand side of the machine. Immediately the carriage will rise lifting the hammer until such time as the hammer lifting catch is withdrawn by the uppermost cam on the cam bar. The hammer will fall, and as the carriage completes its cycle, it will be picked up again. As the carriage rises, lifting the hammer with it, the table rotating switch is actuated, which actuates the timing circuit, which actuates the turntable. (See Table mechanism).

The machine will continue to run until such time as 55 blows have been struck. When the machine stops, the hammer should be lifted by means of the jog switch and an additional layer of soil placed in position in the mold and roughly leveled. Reset the counter and repeat as above. Continue until all layers have been compacted. The collar should be on the mold at least for the last two layers.

In using a 6" mold, the pie-foot hammer must be used. (See hammer instructions and table adjustment.

### For compaction with 4" mold

Remove the pie shape hammer from machine and replace with 5.5lbs round hammer. (See hammer instruction and table adjustments).

Place first layer of soil in the mold and place mold in the turntable and secure.

The height change cam must be set for 12" drop. (See height change instructions).

Set the counter to 24 and press the start button. Machine will run until 25 blows have been struck.

Raise hammer by using jog switch, add a layer of soil and repeat.

### Table Mechanism.

The table mechanism assembly is fitted to and contained within the base of the machine. The table is rotated by a stepping motor. As the table rotating switch, #701, is depressed, the table begins to rotate.

The amount of rotation of the turntable can be controlled by the time-delay circuit located in the switch box on the right side of the machine. Turn the knob clockwise for more rotation or counter clockwise for less.

Before starting the machine the first time, turn the knob all the way to the left. Start machine without hammer, turn knob slowly to the right until the desired amount of index is accomplished. The knob setting can be left set, except for only minor adjustments.

### Table Adjustment. Change mold sizes.

When changing molds from 4" to 6" or vice versa the whole base must be moved. Loosen the 4 hex bolts on the table base. The whole assembly now can be moved in or out for adjusting the clearance between hammer and inside diameter of mold. This adjustment must be made when changing from one mold size to an other.

The clearance should be about .1 in. or 2.5 mm

### **Predetermining Counter**

To start machine up:

Switch the power on, (your wall switch) the counter will light up showing "00". At this point the jog button is operative.

Set the counter by pressing "X10" for tens. "X1" for single digits, then press "Reset". Now the counter is set up.

Push the start button, the machine will start up, when counter shows "00" the machine will stop.

To repeat the same number of blows only the "Reset" needs to be pressed.

If the hammer is picked up by the jog button, or being held up to add more soil the counter should be set one count less than the desired count.

When machine is not in use the power should be turned off. **(Your wall switch).**

### **Height Change Mechanism.**

The top cam, #413, is located on the cam bar, #1410, at the rear of the carriage. The cam disengages the catch #304, and causes the hammer to fall. There are two positions in which this cam can be placed. The lower position will release the hammer from a 12" drop and the upper position will release the hammer for an 18" drop.

To change the cam from one position to an other, it is only necessary to remove the socket cap screw, #418.

The cam is inserted in a slot and can be pulled out by hand. Insert cam in the desired position and replace the screw.

The slot in the upper cam is ment for calibration adjustment.

### **Hammer Lifting Mechanism**

A 1/2 HP electric motor is fitted with a gear box which drives an endless chain. A link on this chain carries a spindle which fits in to a bronze block. The bronze block slides in a horizontal groove in the carriage, #2301.

The carriage slides in a vertical direction on two steel guide bars. The cambar, #1410, has a slot at the upper end in which the top cam, #413, is located. In a slot at the lower end, the pick-up cam, #414, is located.

It is spring loaded. With the carriage in the low position, the spring loaded cam will push the catch #304, into the hammer grooves. The carriage will carry the hammer up where the top cam pulls the catch back and drops the hammer.

### **Chain Adjustment.**

With the carriage in the down position, one should be able to move the chain about 1/4" sideways.

If it gets to be a lot more, it can break the micro switch. To adjust the chain, loosen the 4 bolts holding the idler.

Push the idler up with the 1/4" bolt under the idler shaft. Then tighten bolts again.

### **Hammer Note**

The hammer is guided in its free fall by three vertical rods. The removable rod, #403, acts as a guide to keep the pie hammer from rotating. The hammer with the 2" diameter foot or the hammer with the pie foot weight is 5.5lbs. To change either hammer to 10lbs, a weighted plug is used. It is inserted into the top of the hammer and held in place with a socket capscrew. **NEVER DROP HAMMER ON TURNTABLE OR IN EMPTY MOLD.**

**The hammer must free-fall.** The front cage bar is adjustable. This can be done by moving the adjusting plates #419 top & #420 bottom in or out. Loosen the 1/4 in. bolts somewhat & tap the plates in or out, re-tighten screws.

### **Molds**

The molds are made special for our compactors.

S1410 4" mold, S1415 6" mold, S1411 4" split mold, S1416 6" split mold.

### **Also available:**

M125 Calibration Kit with Micrometer

See ASTM D2168 for procedure.

# INSTRUCTIONS FOR REPLACING MICRO SWITCH

**Before doing anything, remove the hammer & unplug the machine.**

## **To replace switch proceed as follows:**

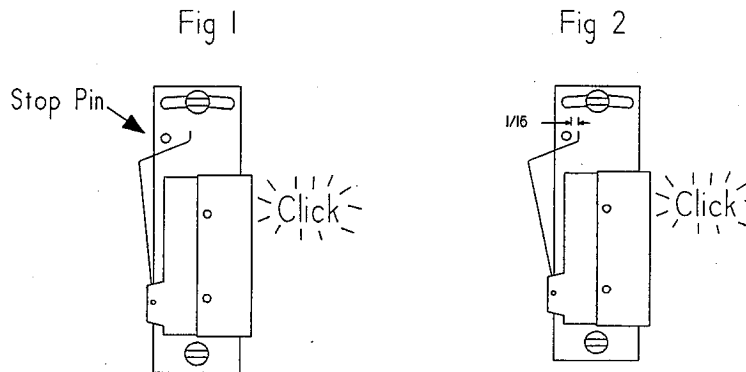
Remove defective switch from bracket, install new switch and switch cover on bracket.

Check the new switch by pressing the lever down by hand to where you hear or feel a click,(see Fig.1).

Release the lever slowly, you should hear or feel another click.

At this point the lever should be about 1/16in. away from the stop pin.

The lever may need to be re-bend a little to get close to 1/16in..(see Fig.2).



## **Proper adjustment of switch bracket:**

Loosen screws "A & B" slightly,move switch bracket all the way to right.

By means of Jog-Button, manipulate the carrier pin to the highest point of the switch lever, as shown in "Fig.3".

Now move the switch bracket to the left, until you hear a click in the switch.

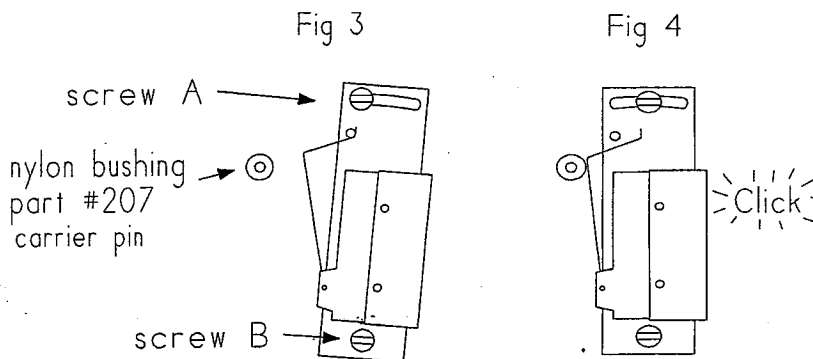
Move it about 1/16 to 3/32in. beyond this point, further to the left,(see Fig.4).

Then tighten screws "A&B". After this is done the machine is ready to run.

### **NOTE:**

There must be a nylon bushing (part #207) on the carrier pin.

Also the chain should not be too loose and flapping.



REF.#	PART #	PART NAME	QUANT.
		M100-3 PARTS LIST	
		ALWAYS GIVE COMPLETE SERIAL NUMBER	
		WHEN ORDERING PARTS	
		Starting with S/N # M100-302143692	
1	102-A	Cover w/Hinges,Latch & Rivets	1
2	103	Latch Assy. w/ Rivets	1
3	104	Rivets for Hinges	12
4	105	Name Plate w/ rivets	1
5	111.1	Hammer Safety Arm 5/8" dia.	1
6	112	Pin for above	1
7	201	Drive Motor 60Hz	1
7	201.1	Drive Motor 50Hz	1
8	202	Gear Reducer	1
9	411	Capscrew (grade 2)	14
9.1	411.1	Capscrew	4
11	412.1	Lockwasher	18
12	412.2	Hex Nut	4
13	203	Brass Block	1
	203-A	Brass Block & Pin Assembly	1
14	204	Carrier Bolt	1
15	205	Lock-Nut	1
16	206	Carrier Link	1
17	207	Nylon Roller	1
18	203.1	Grease Fitting	2
19	208	Drive Chain	1
	208-A	Drive Chain w/Conn. & Carrier Link	1
20	209	Conecting Link	1
	209.1	Roller Link	1
21	210	Drive Sprocket	1
22	211	Key	1
23	212	Motor Key	1
30	2301.1	Carriage	1
	2301.1-A	Carriage Assy. w/all Parts	1
31	2302.1	Carriage Bushings	4
31.1	2302.2	Bushing Retaining Ring	4
33	304	Catch	1
	304-A	Includes: part 304,305 &306	
34	305	Steel Ball	1
35	306	Spring	1
36	308	Hold-Down Plate	2
37	309	Screw	4
40	401	Lower Angle Bracket	1
41	402	Upper Angle Bracket	1
42	402.1	Set Screw	2
45	403-A	Front Cage Bar Assy.w/all Parts	1
46	403.1	Pin	1
47	403.2	Lock-Pin	1
48	403.3	Retaining Pin	1
49	403.4	Spring	1
50	408	Cage Bar	2
51	409.1	Guide Bar	2
52	1410	Cam Bar	1
52	1410-A	Cambar Assy. w/lower & upper Cam	1
54	412	Flat Washer	2

REF.#	PART #	PART NAME	QUANT.
57	413	Upper Cam	1
58	414	Lower Cam	1
	414-A	includes: part 414,429 &430	
59	417	Hammer Surcharge weight	1
60	417.1	Screw, Hammer Weight	1
61	418	Top Cam Screw	1
62	419	Cage adjust Plate-Top	1
63	422	Lockwasher	12
63.1	422.1	Star Lockwasher	4
64	421	Hex Capscrew	8
65	420	Cage adjust Plate -Lower	1
66	423	Cambar Key	1
67	429	Pin, lower Cam	1
68	430	Lower Cam Spring	1
70	501A	Turntable & Shaft assembly, incl.515 Bearing	1
71	502	Turntable Base	1
72	503.2	Turntable Motor	1
73	504.2	Motor mounting Plate	1
74	505	Hex Capscrew	4
75	506	Washer	4
76	507	Drive Gear, 15 Teeth	1
77	508	Table Gear, 100 Teeth	1
78	509	Pin, Turntable	1
80	510.1	Screw, for cable clips	3
81	510.2	Nylon Cable Clip (small)	3
81.1	510.3	Cable clip (large)	1
83	513.1	Rollpin for 507	1
84	514	Rollpin for 508	1
85	515	Bearing	1
86.1	516.1	TT Motor shaft seal	3
87	522	Mold-Screw	2
90	601	Idler Bracket	1
91	602	Bearing	2
92	603	Snapping	1
93	604	Idler Sprocket	1
	604-A	Idler Sprocket w/ Bearings	1
94	605	Snapping	1
95	606	Hex Capscrew (grade 5)	4
96	606.1	Star Lockwasher	4
98	609	Setscrew, Chain adjustment	1
99	609.1	Hex Nut	8
100	701	Switch	1
100	701K	Switch Kit, incl.:1ea.701, 703,207,817. 2ea.704,705.	1
100.1	701.1	Door Switch w/Cord	1
101	702	Switch mounting Plate	1
102	703	Cover, Switch	2
103	702.1	Screw, TT motor & switch plate	5
104	702.2	Pivot Screw	1
105	704	Screw	2
105.1	705	Washer	4
105.2	705.1	Lockwasher	4
105.3	704.1	Switch mounting screw (door interlock)	2
	706	Switch cord	1
106	800.3-A	Complete Control	1
109	802	Rubber Mounts	4
	5655	Special Gear Oil	1

REF.#	PART #	PART NAME	QUANT.
		PARTS FOR 800.3 CONTROL	
	804	Cordgrips	4
5	805.1	Power Relay	1
6	806.1A	Stop-Jog Push Button Assy.	1
7	807.1A	Start Pushbutton Assy.	1
8	809.1	Terminal Strip 2 pos.	1
9	809	Terminal Strip 10pos.	1
10	810.2A	Capacitator-Resistor assembly	1
11	812.2A	Counting Module	1
12	812.2B	Counting Module Display	1
	816	Power Cord 115 volt	1
	817	Switch Cord	1
	818	Drive Motor Cord	1
24	824	KNOB	1
25	825.2A	Potentiometer	1
26	826.2	Timing Module	1



BEFORE CALLING CHECK THIS OUT

PROBLEM	CAUSE	CURE
Counter does not light up Pushbuttons do not work	No power to machine	Check power supply & proper Voltage
Jog-button works Counter shows "00" Run-button does not work	Counter not set up properly	Read counter set-up instructions page 3 in manual
Counter does not count down Turntable indexes properly	Counter does not count down defective counter	replace counting unit
Counter does not count down Turntable does not turn	1)701 Switch out of adjustment,defective 2) Nylon roller #207 missing 3)Timing Module defective	check adjustment, replace replace replace
Counter does not count down Turntable turns continously	Index knob turned too far to right 701 Switch stuck closed Timing Module	1)Turn knob to left for indexing 2) check 701 Switch 3) replace Timing Module
Turntable Motor-very noisy at start sometimes runs cw/ccw or just growls	Timing Module Turntable Motor	1) replace 2) send Turntable Motor in for inspection to us, Special Motor.
Machine runs fine, but misses count & index occasionally	701 Switch out of adjustment	see Switch instruction in Manual page 4
701 Switch keeps breaking	Chain too loose	See chain adjustment, page 3
Hammer does not get picked up	1) lower Cam Spring 2)Cam not moving free 3)Hammer Cage too loose 4) Cam-Bar out of adjustment	1)Remove lower Cam & Spring stretch or replace spring 2)remove any burrs 3) adjust front Cage Bar 4)Cambar needs to be adjusted high enough so the catch snaps into the hammergroove all the way
Hammer drops on the way up	1)Hammercage too loose 2) Catch worn 3) Steel ball under Catch not effective	1)Adjust front cagebar 2) Replace 3) Be sure the steel Ball & Spring are under the Catch
Hammer hits mold after mold size change	Turn-table was not changed after Mold change	See table adjustment page 2 in manual

## Recommended Maintenance For Ploog Compactors

### Daily

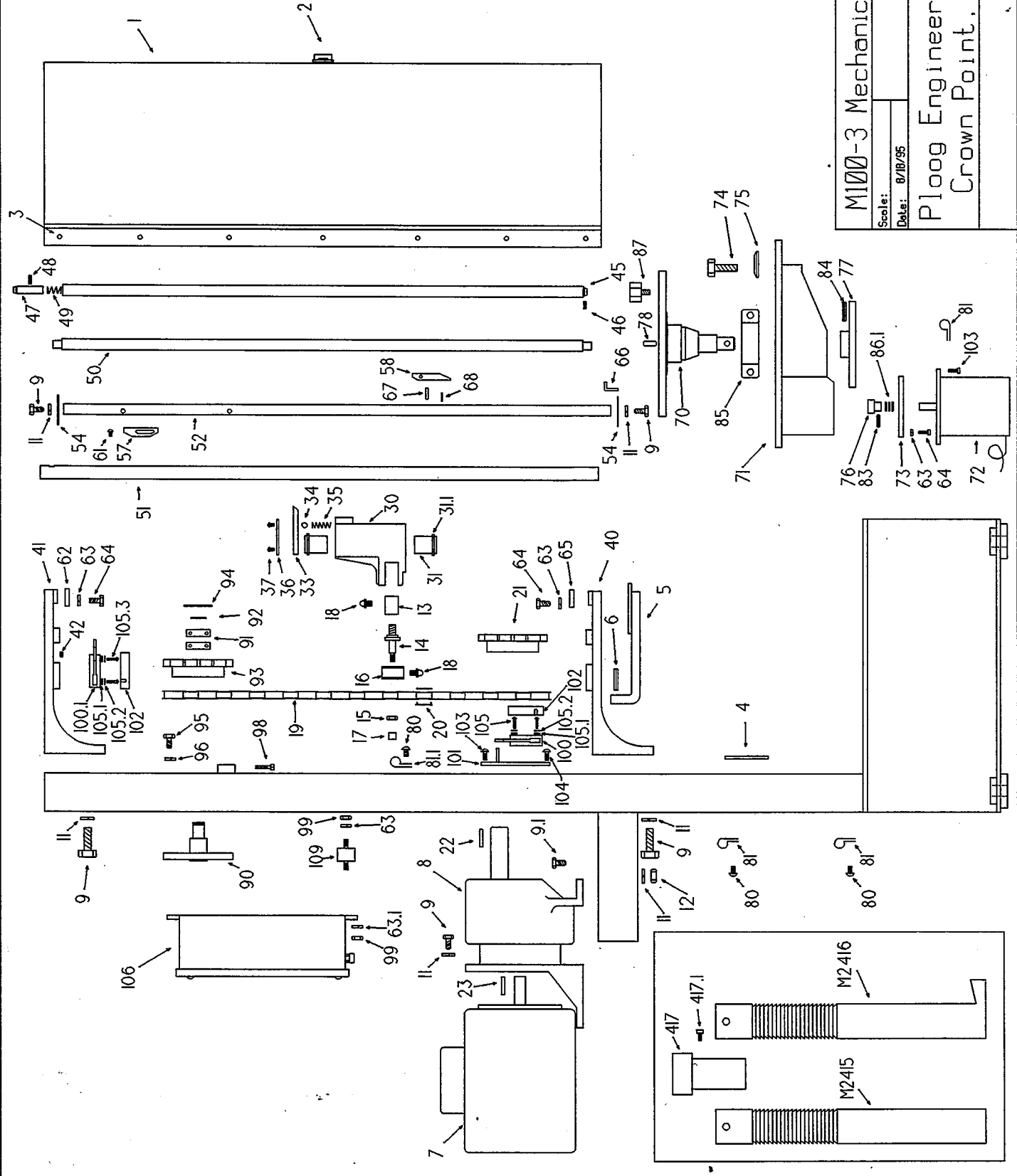
1. On each day that the compactor will be used, before using it perform the following:
  - A. Apply a drop of light oil to the hole in the catch (#304) and verify the catch moves freely (3-in-One Multi-Purpose Oil, or equal). Also lubricate the two grease fittings (#203 brass block and #206 carrier link) with a grease gun, using a good grade ball bearing grease.
  - B. Wipe the guide bars (#409.1) clean with a rag or paper towel (no oil or grease).
  - C. Verify proper clearance between the hammer and the front cage bar (approximately 1/32" clearance). See "Hammer Note" section in this manual.
2. At the end of each day of use, brush off any excess dirt from the turntable area. (Do not wash with a water hose or flush with water. It will rust.)

### Monthly

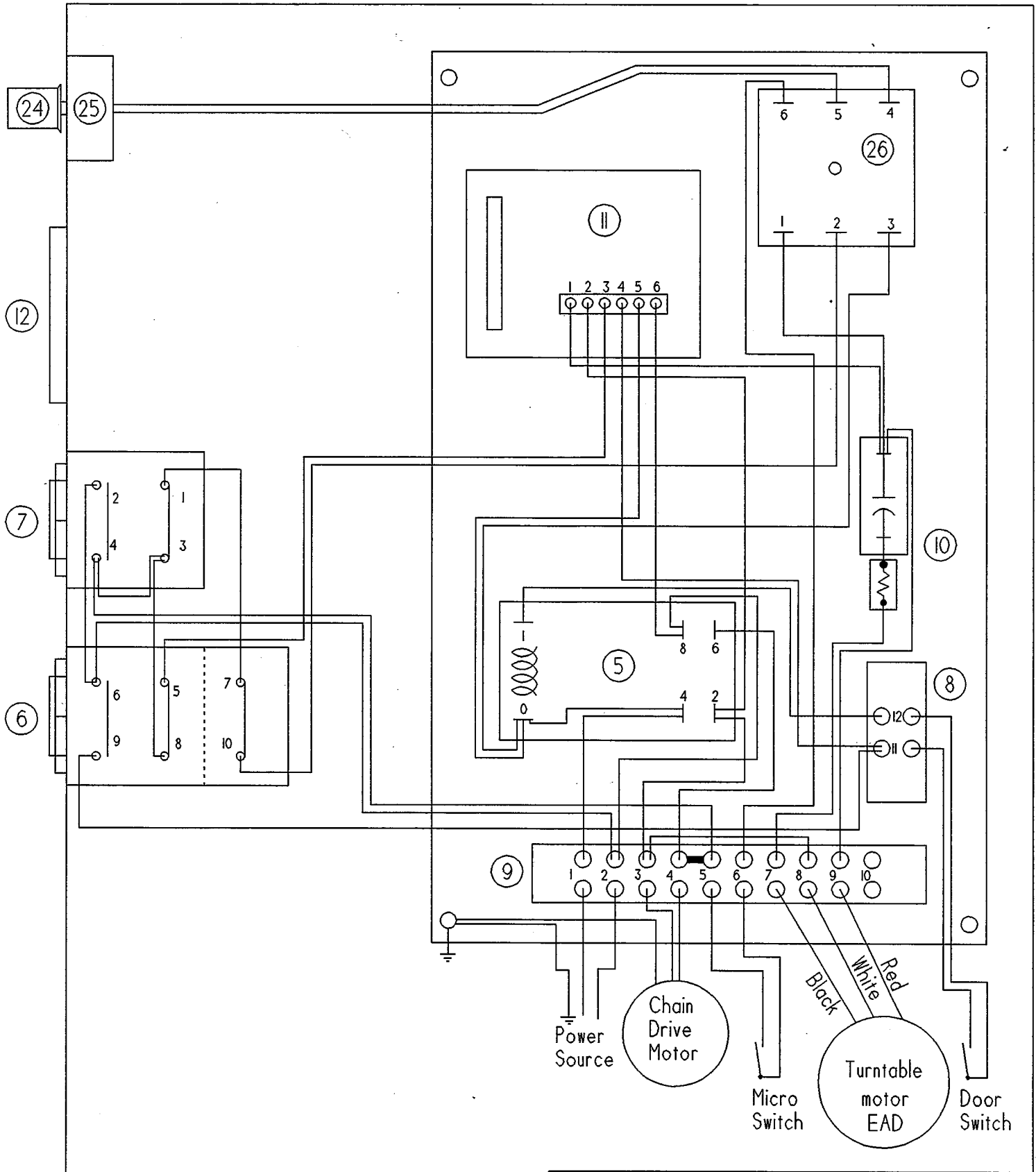
1. Verify proper chain adjustment. See "Chain Adjustment" section in this manual.
2. Apply a spray type lubricant to the chain (WD-40 Multi-Use Product, or equal).

### Every Two Years

1. Verify the oil level in the gear reducer (#202) is at the side plug (Mobil SHC 629, or Mobil SHC 634, or equal).
2. Replace the four carriage bushings (#2302.1).
3. Replace the catch assembly (#304A).
4. Replace the upper and lower cams (#413 and #414A).
5. Replace the micro-switch and nylon roller (#701K).
6. Inspect the brass block for wear (#203). Replace if worn.
7. Inspect the cage bars for flat areas (#408). Replace if necessary.



<b>M100-3 Mechanical Compactor</b>	
Scale:	Drawn By: RF
Date: 8/18/95	Revised: 02/19/2014
Ploog Engineering Co. Inc Crown Point, In. 46307	
Drawing Number CB3A1	



Starts with Serial # M100-302143692		
Scale:	800.3 Control	Drawn by: RF
Date: 08/05/97		Revised: 02/19/2014
Ploog Engineering Co., Inc Crown Point, In. 46307		
Schematic M100/105		Drawing Number PA 246.3