PHARMAFILL™

DEITZ COMPANY, WALL, NJ, USA

Models TC1, TC2 and TCA2 Tablet Counter
Operations and Service Manual

TABLE OF CONTENTS

SECTION 1: GENERAL DESCRIPTION OF THE PHARMAFILL TABLET COUNTER


Model TC2R

Pharmafill tablet counters are usually described as electronic tablet counters. They can be used to count tablets, capsules, caplets, gel caps (hard and soft), and most common solid oral dose type products. They are also used to count cosmetic gel caps and other products with a shape similar to a tablet or capsule. The word tablet as used in the operating manual will include capsules, gel caps etc.

There are two distinct models. The TC1 is the smaller of the two. It has a 16" diameter rim. The TC2 has a 20" diameter rim. They are assembled as a right or left hand version. A right hand TC2-R machine has the diverter head located on the right end of the machine. A TC2-L has the diverter head on the left end. If the optional air guide system (AGS) is installed the TC2-R becomes a TCA2-R.

TC2 machines can be used semi automatically as a tabletop set up where the operator manually moves bottles in and out of the fill stations. They can also be added to a fully automatic filling line with a conveyor and automatic bottle indexing. Automatic lines are described as ABF2 and DABF2. All semi automatic machines are prewired for easy conversion to full automation at a later date.

Tablets are loaded into a bulk hopper. A vibratory feed tray delivers product from under the hopper to the rim assembly and glass plate. As the plate turns it delivers tablets to a guide channel attached to the rim, that lines up tablets single file. The line of tablets leave the guide channel as they fall off the edge of the turntable. They pass through the diverter head where the tablet flow is directed to one of two fill station funnels. Bottles are placed under the funnels. When a bottle is filled the machine directs the flow to the other fill station and the filled bottle is replaced with an empty bottle.

Counting is accomplished by a tablet falling through a photoelectric scanner beam, creating a scanner signal. The electronic counter accumulates these signals until the number of tablets counted equals a preset number entered into the count register, at which time the counter resets and the flow of tablets is diverted to the other fill station. Special circuits make it possible to count clear gel caps which would otherwise present a problem for photoelectric type counters. These machines can count standard type products at 1200 to 3000 units per minute.

SECTION 2: MAJOR COMPONENTS OF THE TC

2.1 MAIN CONTROL PANEL

A. PC3 Power Control Module AD0997
B. DC3 Electronic Counter AD0770-2
C. Bottle Counter
D. Scanner Signal Display Panel AD0985

2.2 DIVERTER HEAD ASSEMBLY

A. Scanner AD0956
B. Diverter Flag
C. Solenoid Assembly
D. Funnel Assembly

2.3 RIM ASSEMBLY

A. Product Guides
B. Spring Loaded Deflector Guide
C. Air Guide Nozzle Assembly
D. Rim Cover

2.4 GLASS PLATE ASSEMBLY

A. Glass Plate
B. Glass Support Ring
C. Glass Protecting Washer
D. Ring Nut

2.5 VIBRATOR HEAD ASSEMBLY

A. Vibrator
B. Feed Tray
C. Sieve Plates
D. Dust Cup

2.6 HOPPER ASSEMBLY

A. Hopper
B. Extension

2.7 ELECTRONIC ASSEMBLIES

A. Interconnection Board AD0995
B. Power Supply AD0986
C. Signal Processor Board AD0984
D. Scanner Signal Display Panel AD0985

2.8 AS1 AIR SUPPLY ASSEMBLY

A. Regenerative Blower
B. Air Filters

SECTION 2.1: MAIN CONTROL PANEL

2.1A PC3 Power Control Module AD0997

A blue panel mounted in the control door. Switches on this panel deliver AC power to the entire tablet counting machine and also specifically to the turntable motor and feed vibrator. The PC3 connects by two cable connectors to the AD0995 Interconnection Board. Fuses that protect the PC3 circuits are normally located on the Interconnection Board.

Main Power Switch A lighted rocker type switch. Switches power to the entire machine through the Interconnection Board.

Motor (Turntable) Switch A lighted rocker switch that turns on power to the turntable motor circuit. Turntable speed depends on the adjustment of the motor speed control knob. The motor switch delivers power to the feed (vibrator) switch.

Feed (Vibrator) Switch A lighted rocker switch that turns on power to the feed vibrator circuit, if the motor switch is also on. Feed rate depends on adjustment of the feed control knob and a signal from the automatic vibrator feed control sensor.

Exceptions There are several different versions of the PC3 in use. This information is current. Older TC machines may have a PC3 that looks the same but is wired differently. Older PC3s have fuses located on the back panel.

2.1B DC3 Electronic Counter AD0770-2

A blue panel located beside the PC3. The DC3 displays how many tablets are counted in large red numbers up to 9999.

Preset Count Register A mechanical count register located below the display can be preset with a number at which the DC3 will reset. Push the square buttons above or below the register window to change the preset number.

Count Reset When the DC3 resets, the diverter head changes filling stations. A push button manually resets the counter and 0000 is displayed.

Exceptions The DC3 normally displays 0000 when power is applied. If a number such as 2222 is displayed and can not be reset by the reset push button, it is an electronic quirk. Change the number to 2223 by passing your finger through the scanner beam and then push the reset button.

2.1C Bottle Counter This is a small counter module located at the hopper end of the control door panel. It is a self contained battery operated device that counts the number of times the DC3 counter resets. A reset button below the display will reset the displayed count to zero. The counter can be used to show how many bottles have been filled during a production run. The battery can not replaced. When it fails, the entire counter module must be replaced.

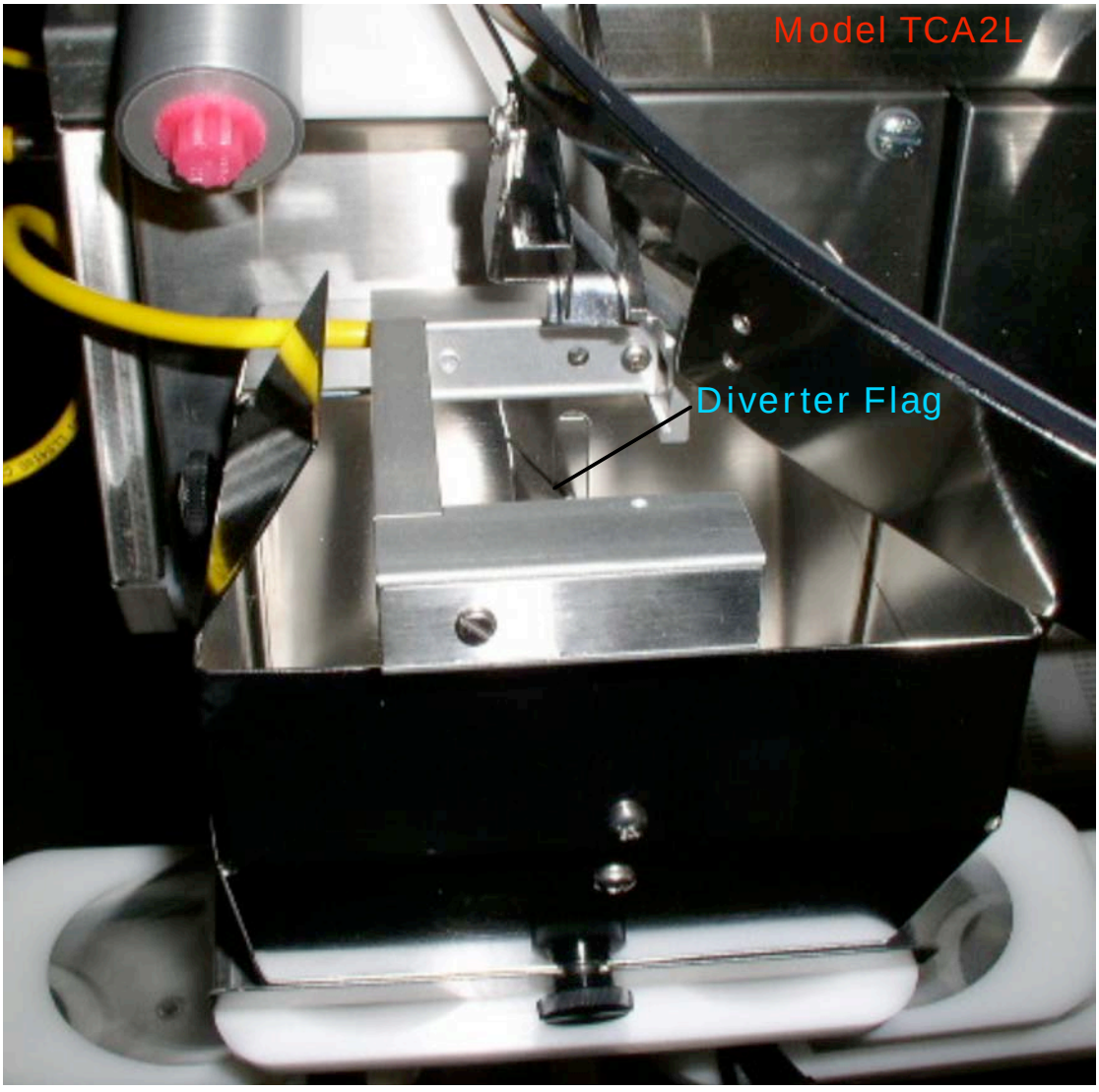
2.1D Scanner Signal Display Panel AD0985 A 10 segment bar graph display shows the scanner signal level. It reacts quickly as pills pass through the scanner beam. Using the knob located below the display, set the signal to 9-10 level for normal operations. The red LED indicator to the left of the display is lit when the signal processing circuit is ready to count. If this LED is not lit, the TC can not count and some corrective actions are probably necessary.

Clear Gel Cap Center Overlap This circuit makes it possible to count clear gel caps accurately. A green LED located above the overlap adjustment knob flashes when product pass the scanner beam. Always set at minimum (CCW) when counting pills that are not perfectly clear.

SECTION 2.2: DIVERTER HEAD ASSEMBLY

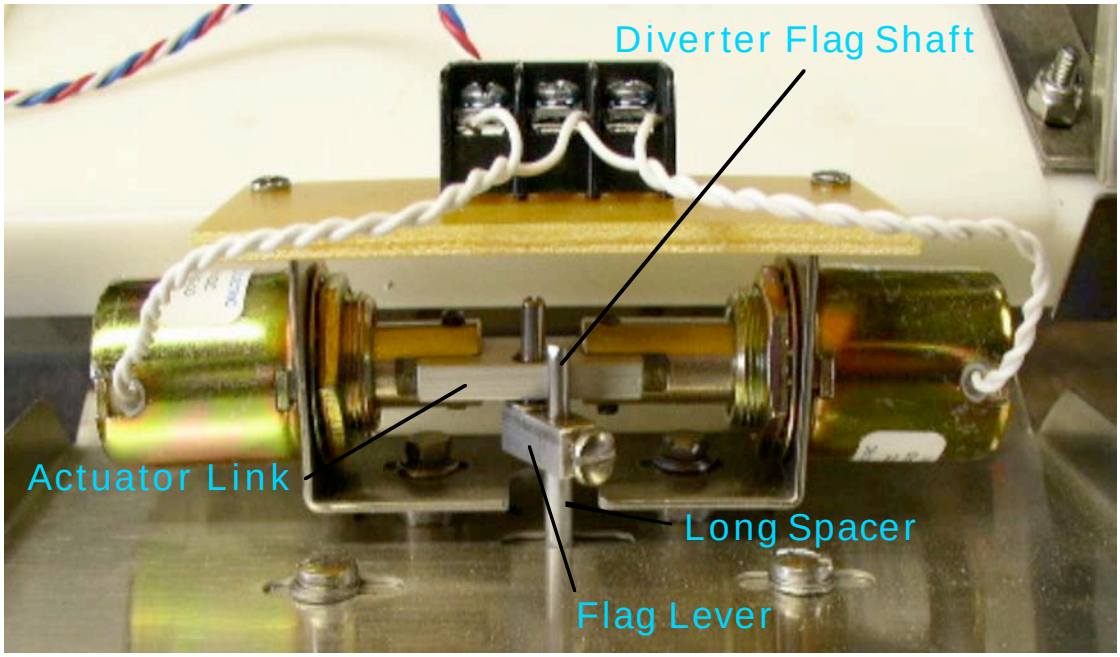
2.2A Scanner AD0956 Tablets fall through the scanner beam when they drop from the edge of the glass turntable plate. A bright red LED provides the light beam that falls on a photocell assembly on the opposite side of the scanner gap. The scanner signal level depends on the intensity of the light received by the photocell and the setting of the scanner signal intensity adjustment. It is indicated by the scanner signal display panel.

Beam Centerline Indicator Two small dots are machined in the top of the scanner over each side of the scanner beam gap. One is over the center of the red LED and the other is over the center of the photocell. When tablets are falling through the scanner gap they must fall precisely between these dots. The rim location adjustment should be used to adjust the tablet flow so it does fall between the dots.



2.2B Diverter Flag Described as a flag because of its shape, it directs the tablets to the right or left fill funnels. The flag shaft must be straight and the flag must move freely. It is pulled from side to side by a pulsed signal to a solenoid assembly located behind the diverter head.

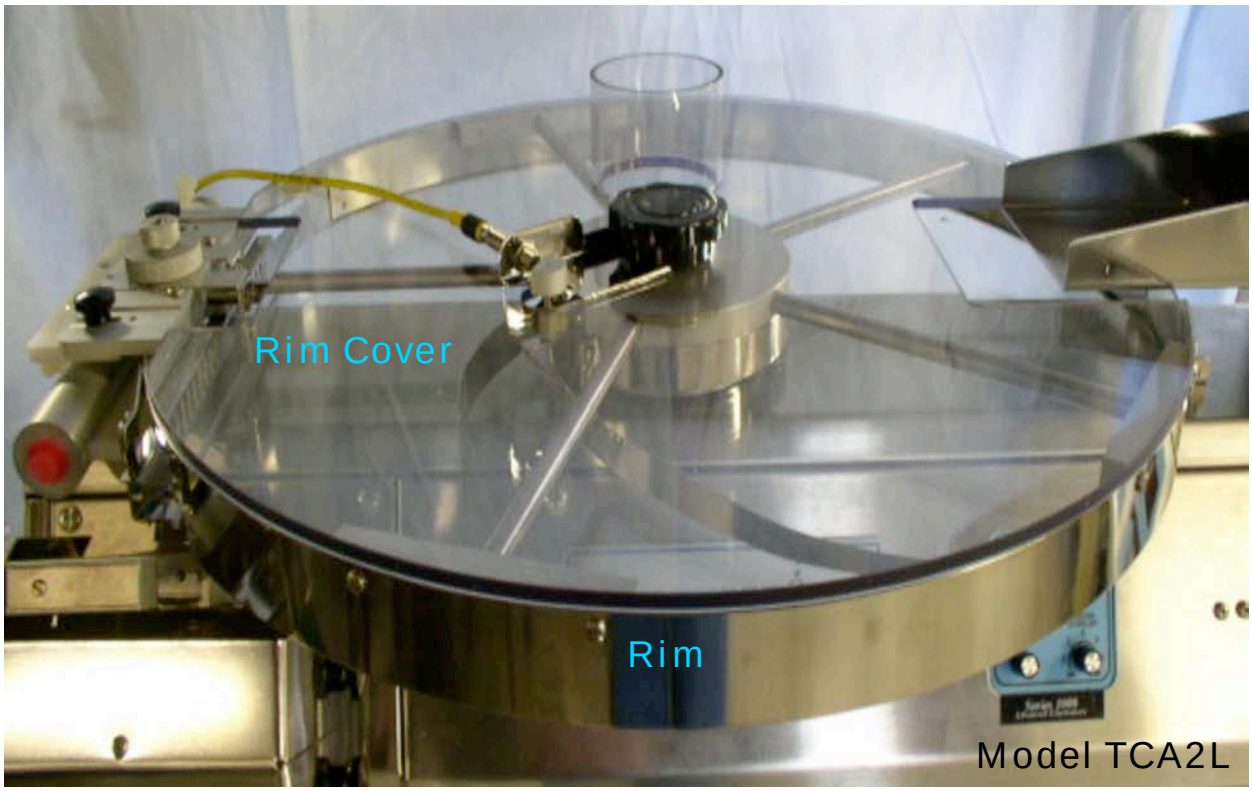
2.2C Solenoid Assembly Two electric solenoids receive a momentary pulsed signal from the main signal processor board to move the diverter flag. Two aluminum links attach between the solenoid center poles and the flag shaft. These links must be in good condition and may be lubricated with light oil for reliable operation. Never put oil on any part of the solenoid.



2.2D Funnel Assembly At the bottom of the diverter head assembly is a funnel holder bracket with a pair of funnels installed. There are four different size funnels. Select a funnel with a bottom opening that closely matches the bottle opening. Remove the bottom plate of the funnel holder, put the funnels in the holes in the plate and reinstall the plate to correctly install the funnels. Funnels do not drop in from the top of the funnel holder. See Section 3 photos 5 & 6.

SECTION 2.3: RIM ASSEMBLY

2.3A The Rim Round stainless steel band that surrounds the glass plate. When it is assembled at Deitz Co. we use an assembly jig that correctly spaces the spokes. We do not recommend disassembling the rim. The rim contains the load of tablets and supports the various product guides. The glass turntable plate should not rub against the rim. The rim is held in place by aligning the alignment fork on the side of the rim band with the adjustable alignment pin located under the vibrator feed tray. The rim is held in place by the center knob through the rim hub.

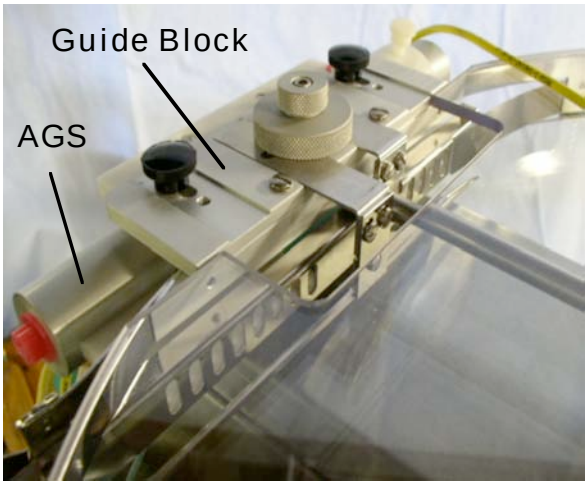


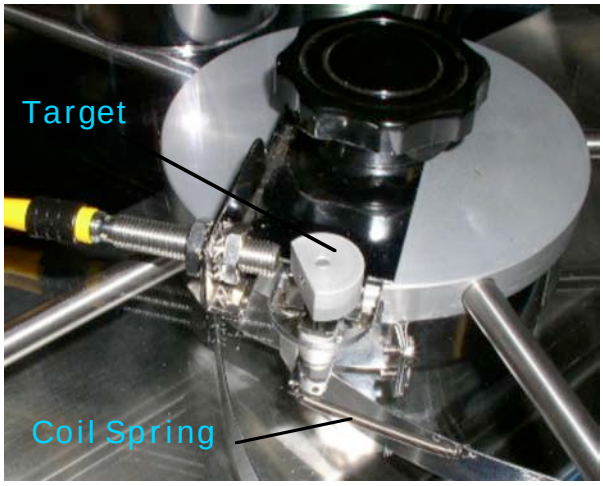
2.3B Product Guides You must use the guides that are appropriate for the size (TC1/TC2) machine and the configuration (R/L.) The following guides are part of the guide adjustment block assembly: tablet guide, capsule guide, height guide, kick out wire guide. In addition there is a flow corrector guide and the optional air guides may be part of the machine. The guides make the guide channel through which the tablets move single file to the edge of the turntable. Look for more information about the guides in Section 4.

2.3C Spring Loaded Deflector Guide Attached to the side of the center hub. It pushes the tablets toward the inside edge of the rim band inline with the opening of the guide channel. Spring tension can be adjusted by moving the tip of the coil spring into a different hole in the deflector guide. The half-round metal target for the automatic vibrator feed sensor mounts on top of the deflector guide shaft. See photo below.

2.3D Air Guide Nozzle Assembly This optional assembly attaches under the guide block. Look for information in the Air Guide System (AGS) section. See photo below.

2.3E Rim Cover Deitz Co. provides a clear poly carbonate cover for the rim. The cover has a 3" diameter round tube to which vacuum can be attached. The cover is held in place by the same knob that holds the rim in place.





SECTION 2.4: GLASS PLATE ASSEMBLY

2.4A Glass Plate A nominal .25" thick and either 16" or 20" in diameter. Glass is used because it will remain flat under all conditions and does not react with most chemicals. The center hole is precisely located and drilled. It is not easy to duplicate. See Section 3 photo 1.

2.4B Aluminum Ring Supports the glass. It is machined to fit level on the glass support hub. A slot in the ring must line up with a pin located in the side of the glass support hub. See Section 3 photo 1.

2.4C Glass Protecting Washer Placed on top of the glass before the ring nut is tightened. This protects the glass from abrasion by the ring nut. See Section 3 photo 2.

2.4D Ring Nut Large threaded ring with a knurled edge. It tightens the glass on the glass support hub. Hand tighten. Do not use a tool on this ring nut. See Section 3 photo 2.

SECTION 2.5: VIBRATOR FEED ASSEMBLY

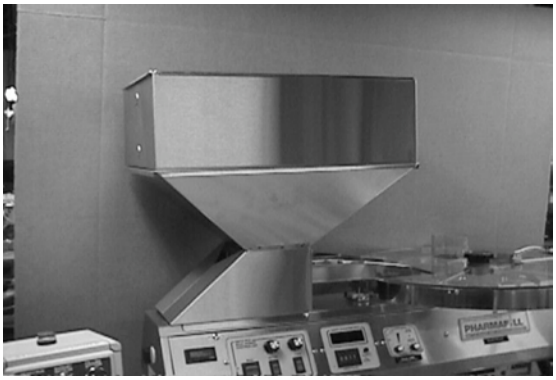
2.5A Vibrator Inside the machine, under the hopper area. It shakes the feed tray and causes the tablets to spread out and move toward the rim. The rate of vibration is controlled by the knob on the PC3. The automatic vibrator feed control circuit will also turn the vibrator on and off depending on a signal from the automatic vibrator feed control sensor. The vibrator will not operate if either the feed or the motor switch is off.

2.5B Feed Tray Mounts on top of the vibrator. Be sure the hopper is not touching the tray during operation. See Section 3 photo 7.

2.5C Sieve Plate Fits in the base of the tray. Dust and broken pills fall through the holes in the plate to the bottom of the tray. The debris falls through a slot in the tray into a dust cup located under the feed tray. There are three sieve plates each with different size holes. A solid panel has no holes. See Section 3 photo 8.

2.5D Dust Cup Under feed tray. Accumulates dust and debris that falls through sieve plates, into feed tray, and through slot in bottom of feed tray. See Section 3 photo 9.

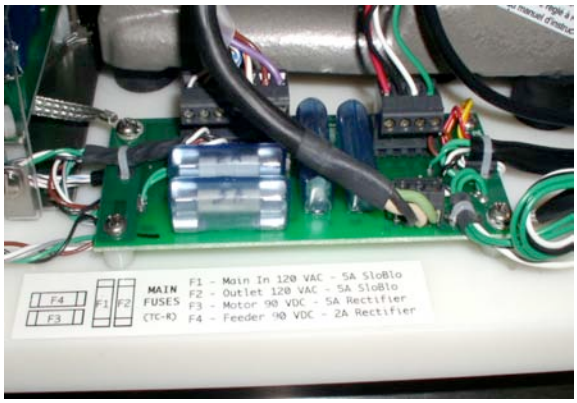
SECTION 2.6: HOPPER ASSEMBLY



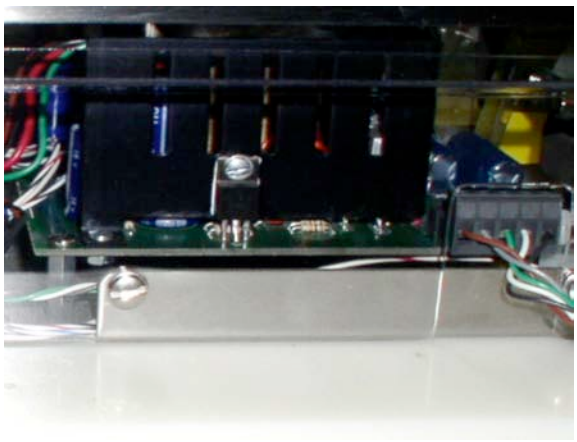
2.6A Hopper Nested around the feed tray. It is not attached to the machine. Open the hopper door to allow a product flow that is equal to the count rate. Do not overload the tray.

2.6B Hopper Extension Nests on top of the hopper. It roughly doubles the capacity of the hopper.

SECTION 2.7: ELECTRONIC ASSEMBLIES



2.7A Interconnection Board AD0995 Accessible from the rear of the machine. It is the connection point for 115 vac line power, the PC3, vibrator and the power supply. It has four fuses for main power, external outlet, motor and vibrator circuits.



2.7B Power Supply AD0986 Reduces 115 vac to low voltages required for the control circuits. Three LED indicators, red, yellow, and green, show the status of certain voltages and signals. A metal heat sink on this board is normally hot.

2.7C Signal Processor Board AD0984 Coordinates inputs and outputs for most of the machine operations. This board is attached to the scanner signal display panel by a flat ribbon cable and can not be disconnected from it. Three test switches should not be touched. The test switch handles normally point toward the left. LED indications on this board show the status of machine operations. There is one LED that always blinks.

2.7D Scanner Signal Display Panel AD0985 Attached to the signal processor by a flat ribbon cable. It is mounted on the control door. There is a bar graph display, signal intensity adjustment, and clear gel cap center overlap adjustment on the panel that are operator adjustments. On the opposite side of the panel inside the machine are three small trim-pot adjustments that the operator will not normally adjust. The DC3 connects to this board. See photos in Section 2.1D and Section 6B.

SECTION 2.8: AS1 AIR SUPPLY ASSEMBLY

2.8A Regenerative Blower Installed in a stainless steel enclosure or inside the LPA2 Lift Platform when used as part of an automatic ABF2 line. This source of low pressure high volume air is very suitable for the air guide system purpose. Unlike most common compressors it does not condense vapor in the air, it is oil-less, quiet, and small.

2.8B Air Filters There are two paper filters used with the blower. One cleans the incoming air and the other cleans the outgoing air. Normally the outgoing filter is clean. Never interchange the filters – opposite sides are contaminated.

SECTION 3: HOW TO PUT THE TC IN SERVICE

3.1 To install the glass plate, remove the rim by loosening the black knob in the center of the rim hub. Remove the ring nut and the plastic protective washer. (Picture 2)

3.2 Install the glass with aluminum support plate on the bottom. If plate is not glued to the glass put the plate over the hub first. The machined surface surrounding the hole must be facing down. Align the slot in the aluminum plate with the pin in the hub. (1)

3.3 Put the plastic washer on top of the glass (over the hub) and screw down the ring nut. Hand tighten. Be sure the glass is level on the hub. (2)

3.4 Put the rim on the hub. Be sure the rim alignment fork surrounds the pin correctly, under the vibrator feed tray. Lift the tray slightly to get the rim in position. (3)

3.5 Connect the multi pin connectors of the power cable together to get power to the TC. Be sure the main power switch on the TC is off. This is the wide red switch on the PC3 power control module. Plug the TC into a 115 vac power source. (4)

3.6 The diverter head has a funnel holder assembly located below the bottom opening. Install funnels if there are none in place. Use the largest size funnel that matches the bottle opening. Remove the stainless steel bottom plate from the diverter head, drop funnels through the holes and reinstall. (5 & 6)

3.7 The TC is supplied with a solid plate inside the vibrator feed tray. The plate can be replaced by a sieve plate. The sieve plate holes allow dust and pill chips to drop through to be collected by the dust collecting box. Bend the sieve plate ends down so the plate doesn't rattle when the tray is vibrating. Tighten the two sieve plate knobs so they don't loosen and fall out. (7 & 8)

3.8 Put the dust cup under the bottom slot in the feed tray. (9)

3.9 Turn on the motor switch and adjust the speed to #5. The glass plate should turn. Listen for rubbing sounds. Be sure the guides do not rub against the glass. If they do, adjust the guides so they don't rub. (10)

3.10 Put tablets (capsules, etc.) on glass plate, entering the guide channel. Use the capsule or tablet guide depending on product. Adjust channel to be slightly wider than product. Eliminate piggyback (one on top of another) problems. For tablets use height guide. For capsules use kick-out wire guide. (10)

3.11 If the Air Guide System (AGS) is part of the machine use the capsule guide at all times. Adjust the nozzle level to knock off piggybacks. Adjust air pressure by opening the air dump collar at the rear of the nozzle assembly. Nozzle ends must always be against the slots in the slotted guide plate. If not the air flow will be very ineffective. (14)

3.12 As tablets drop off the edge of the glass observe their trajectory through the scanner. They should drop through the center line of the scanner beam. Beam centerline is indicated by two dots machined in the top of the scanner. If the trajectory is not centered you can adjust the guide drop off point by adjusting the rim location. Turn the rim alignment screw located under the vibrator pan to move the entire rim and guide assembly position. (3 & 11 & 12)

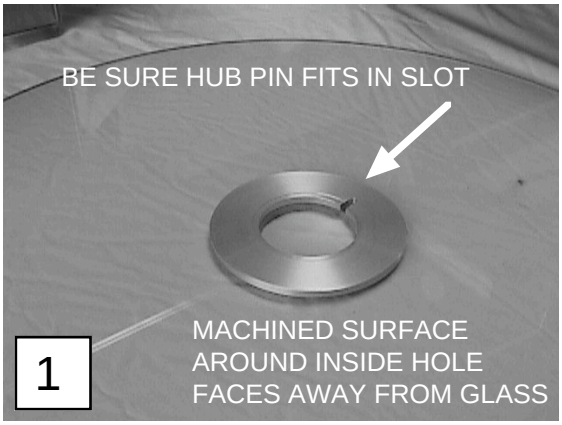
3.13 Check the scanner signal intensity on the scanner signal display panel. Using the knob under the bar graph display, set the signal level so the 9th and 10th bars are red. As tablets drop through the scanner beam observe the scanner signal deflection. Ideally the signal will drop to as low as 1 or 2 when the scanner beam is briefly blocked by the falling tablet. The red LED light to the left of the bargraph will go out when a count occurs and be lit in between falling tablet detection. (15)

3.14 Load the number of pills to be put into a bottle into the preset register by pressing the buttons above or below each of the four digit displays. After loading the number push the reset-load button. (16)

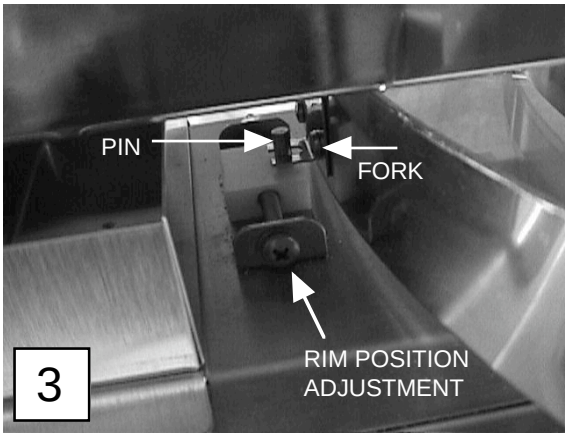
3.15 The Clear Gel cap-Center Overlap adjustment is used only for clear gel caps. For other type products keep this adjustment fully CCW. The green light should not light during a non-gel cap count. See Section 6 for more information. (15)

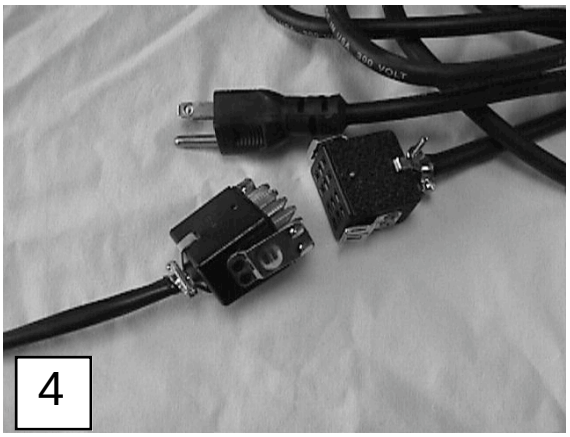
3.16 Adjust the Automatic Vibrator Feed target so the vibrator stops when the spring loaded deflector guide tip is move approximately 1 inch by a load of pills on the glass plate. When the light at the rear of the sensor turns on the vibrator should stop. (13)

3.17 Adjust the bottle table height so the funnels are about 1/4” above the bottle opening. Adjust the bottle locator assembly to or fro to line up bottles quickly under the funnel. (5)


BE SURE HUB PIN FITS IN SLOT
1
MACHINED SURFACE
AROUND INSIDE HOLE
FACES AWAY FROM GLASS


2
THIN PLASTIC WASHER
GOES UNDER RING NUT


PIN
FORK
3
RIM POSITION
ADJUSTMENT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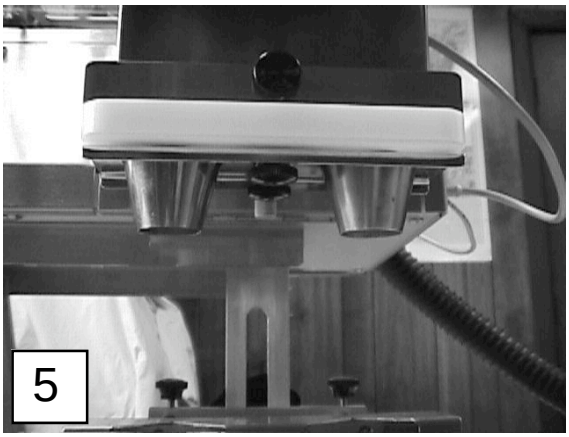
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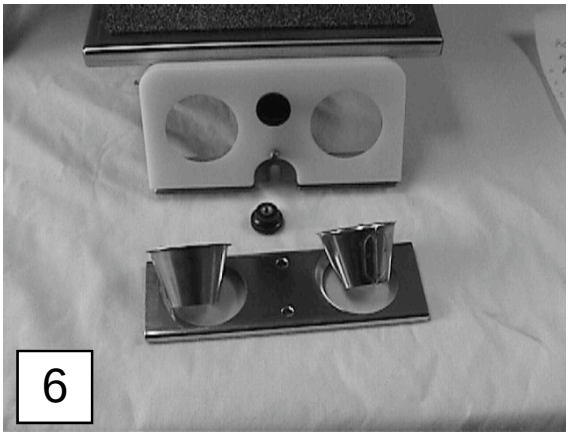
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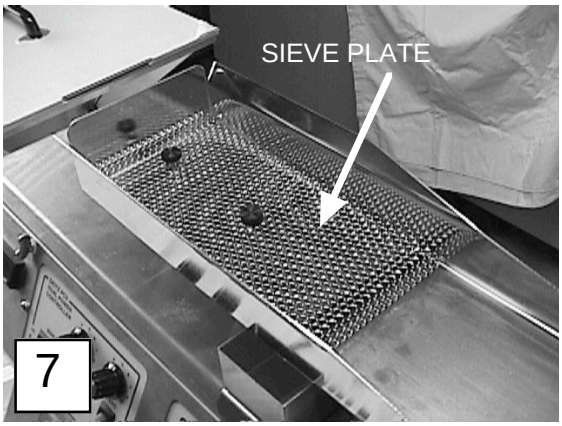
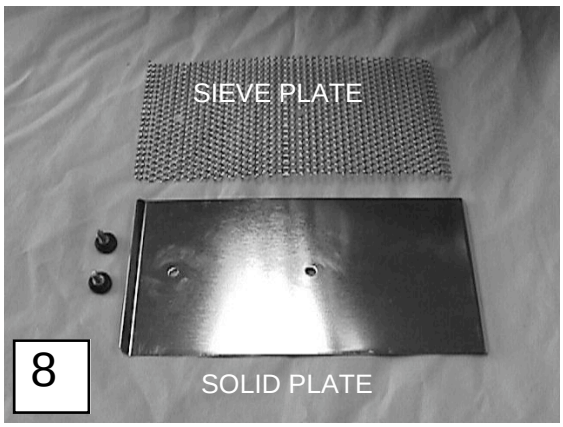
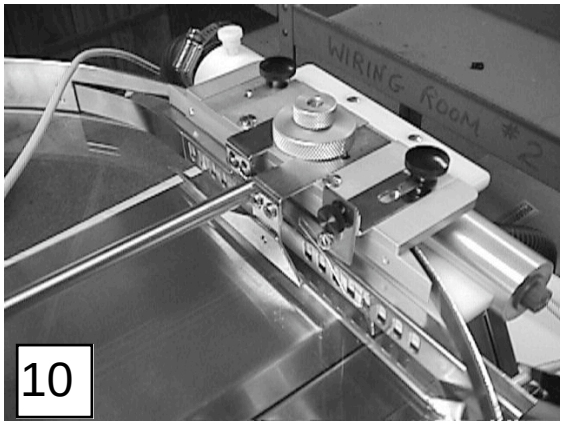

SIEVE PLATE
7


SIEVE PLATE
8
SOLID PLATE


9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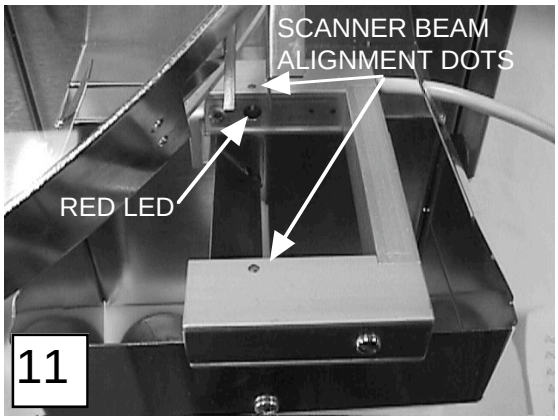
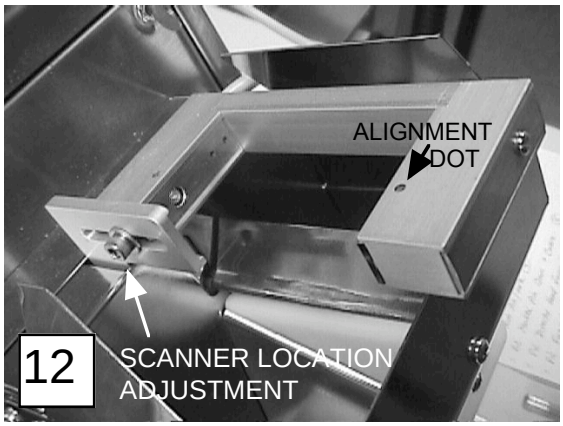
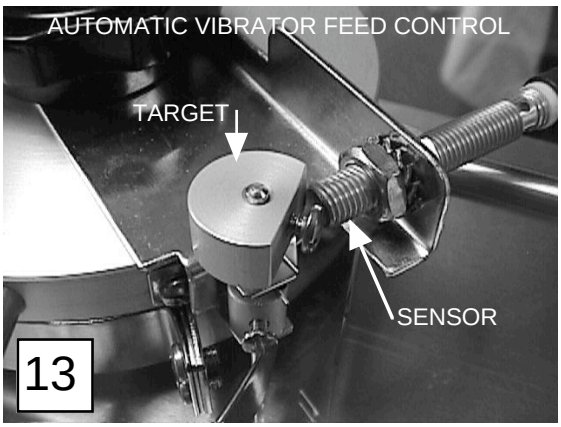
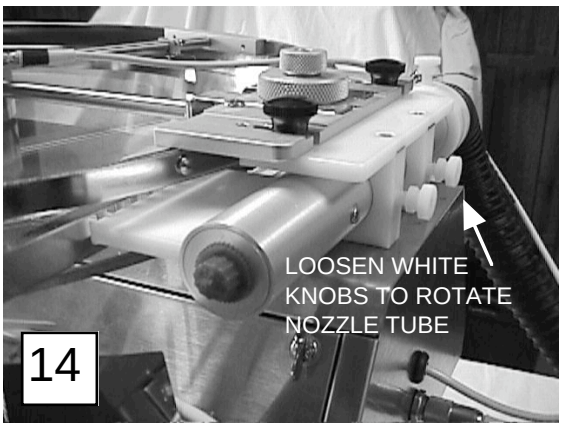
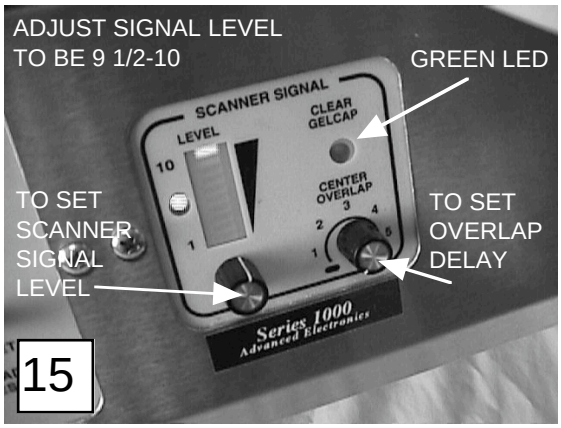

SCANNER BEAM
ALIGNMENT DOTS
RED LED
11


ALIGNMENT
DOT
12
SCANNER LOCATION
ADJUSTMENT


AUTOMATIC VIBRATOR FEED CONTROL
TARGET
SENSOR
13


LOOSEN WHITE
KNOBS TO ROTATE
NOZZLE TUBE
14


ADJUST SIGNAL LEVEL
TO BE 9 1/2-10
GREEN LED
SCANNER SIGNAL
LEVEL
CLEAR
GELCAP
CENTER
OVERLAP
TO SET
SCANNER
SIGNAL
LEVEL
TO SET
OVERLAP
DELAY
Series 1000
Advanced Electronics
15


DEITZ COUNTER DC3
0013
PRESET VALUE
RESET
&
LOAD
PRESET
16
LOAD PILL COUNT HERE

SECTION 4: RIM GUIDES DESCRIPTION AND SET-UP

4.1 The TC machine counts pills, capsules, etc. when they fall from the edge of the glass turntable, through a beam of light projected from a red light emitting diode (LED) light source to a photoelectric sensor. The TC scanner actually detects the shadows of a product passing through the red LED light beam. Product must drop through this beam to be counted. The accuracy of the TC depends a great deal on proper adjustment of the product guides. They are designed to accurately deliver a flow of product to the counting sensor area with little deviation from an ideal flow axis. "Piggyback" product and jam-ups in the guides must be prevented. Certain guides are intended for certain type products. Guides can be modified to accommodate unusual shapes and sizes.

4.2 Guide Support Block Assembly Centerpiece of the guide system. The main feature of this assembly is that once it is lined up with the centerline of the diverter flag and the scanner sensor LED axis, it maintains the centerline position regardless of changes to the width of the guide opening. Four slots hold guides in position (never four at a time.) All guides should fit tightly in the slot with little side-to-side movement. See Section 3, photo 10.

4.3 Outer Flow Guide Attached to a short guide support arm. It is one side of the guide channel. A flexible stainless steel tab attached to the rim must be located to the inside of this guide to conform to the bend in the rim at the entrance to the guide channel. As product circles on the glass turntable it moves to the perimeter and the outer flow guide directs it into the guide channel. It is slotted for use with the AGS option. See photo below.

4.4 Tablet Guide Attaches to a long guide support arm. It is a rectangular blade with a sharp vertical edge at the front. It is used with tablets only and is always used with the height guide. It separates the flow of product on the glass turntable into a single line of tablets that pass down the channel. See photo below.

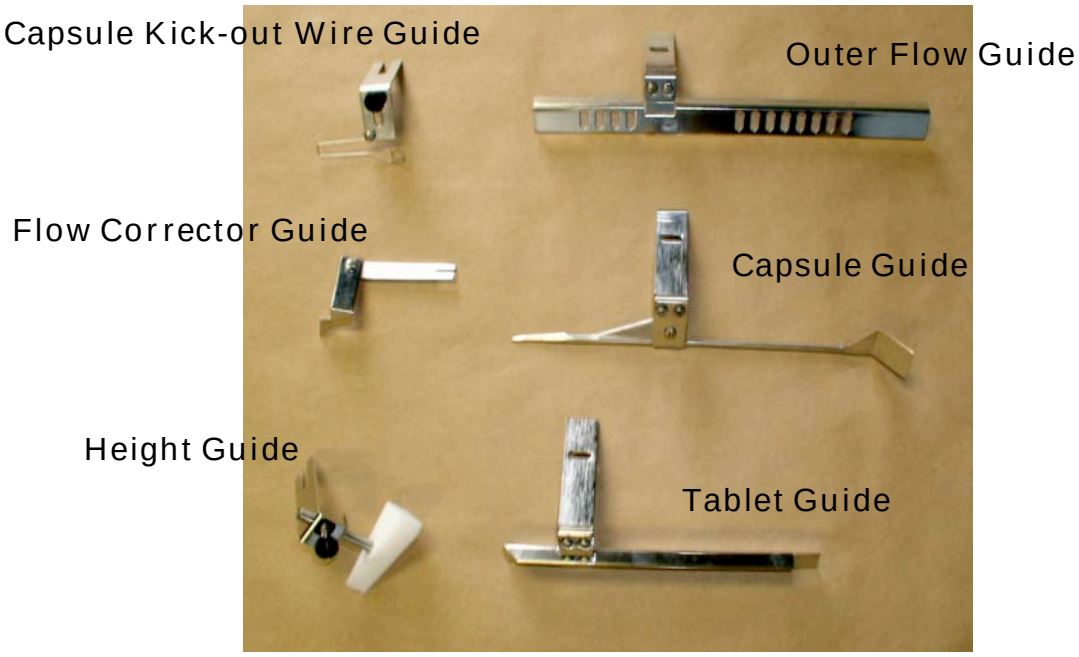
4.5 Height Guide White plastic wedge that attaches to an adjustment bracket by a rod. Its function is to knock off the top tablet of piggybacked pairs as they attempt to enter the guide channel. Use with tablets only. See photo below.

4.6 Capsule Guide Attaches to a long guide support arm. For use instead of the tablet guide. It has a long, narrow, pointed end, and is 1/8th inch high. Use it for capsules, caplets, and gel caps. Do not use the height guide with this guide. As capsules align with the opening on the capsule guide, the piggyback condition corrects itself as the top capsule rolls off the lower capsule and falls outside the low profile edge of the capsule guide. Should this not be the case, then the piggybacked capsule will run into the capsule kick-out wire which will eject the top capsule at the opposite end of the channel. The capsule guide attaches to the same type guide support arm as the tablet guide. This guide is used at all times with the AGS option. See photo below.

4.7 Capsule Kick-out Wire Guide A stainless steel wire, bent to achieve a desired effect. When adjusted correctly the rectangular end is so that the top capsule of a piggybacked pair is diverted out of the guide channel. This guide must be mounted so that it retains its springiness and will not create a blockage. When a capsule hits, the wire bounces and ejects the capsule. Not for use with AGS option. See photo below.

4.8 Deflector Guide Spring loaded, curved blade that is attached to the rim center hub. It pushes the product toward the perimeter of the rim. Because it is spring loaded it gives under a load. The spot where it attaches to the hub is the only adjustment. You can increase or decrease the force that is applied to the product flow by moving the diverter spring to a tighter hole position. Bend the blade to suit your conditions. There is a band around the bottom of the center hub above the glass. An extension from the band should be adjusted to deflect product away from the hub to the deflector guide so that the product can not get behind the back side of the diverter guide where it attaches to the hub. There is a metal block attached to the top of the diverter blade shaft. The block triggers the sensor that is part of the Automatic Vibrator Feed Control (AFC.) See Sections 2.3C and 7 for details.

4.9 Flow Corrector Guide (FC) Attached to rim segment hardware under the end of the guide channel. It has a wedge-shaped flat surface intended to fill in the space between the edge of the glass turntable, perpendicular line to the guide channel. It allows product dropping from the turntable to fall from an edge that is square with the guides rather than at the angle presented by the glass edge. It is adjusted so the product will not stop on its surface. The trailing edge is bent and polished to present minimal resistance to passing product. Product will touch this guide as it drops, but only enough to assure that the drop is straight. See photo below.



SECTION 4A: RIM GUIDES ADJUSTMENT PROCEDURES AND COUNT ACCURACY TIPS

There are a few basic rules to follow for most types of tablets and capsules. You should use the capsule or tablet guide for the appropriate product. The turntable speed must be suitable for the difficulty of aligning the product to the channel. This section will itemize and explain in detail the major considerations.

4A.1 Channel Width Especially important. It should be as narrow as possible and yet present no resistance to product flow. The product should not bounce from side to side within the channel. This causes an uncertain drop trajectory from the edge of the glass depending on which side of the channel was last hit.

4A.2 Outer Flow, Tablet and Capsule Guides Can be adjusted for their height over the glass. They should be no more than half the thickness of the product counted. The guides should not scrape on the glass or they will scratch it. The capsule guide tip must be as close to the glass as possible so that the point does not hold capsules or caplets at the opening of the channel.

4A.3 Height Guide Used with the tablet guide only. It should be adjusted slightly higher than the tablet height. When piggybacked tablets attempt to enter the channel this guide will knock off the top tablet. The height guide will jam up with capsules and especially caplets and soft gel caps.

4A.4 Kick-out Wire Guide Normally used with capsules, caplets, and soft gel caps but it can be helpful for tablets as well if the capsule guide is being used. It is used with the capsule guide unless the AGS option is used. You must adjust this guide so that the rectangular paddle at the end will nudge the top capsule of a piggybacked pair out of the guide cutout opening. Do not let the wire make contact with the inner edge of the outer flow guide or it will lose its necessary springy quality. Bend the wire to get everything in place. If the Air Guide System option is part of the TC machine, see AGS information.

4A.5 Glass Turntable Should turn flat. There should not be a variation of greater than 1/16", up and down, as the glass turns. "Wobble" is often caused by foreign matter (dirt) between the bottom of the glass surface and the top of the glass support ring. A small imperfection close to the main hub is greatly magnified at the outer edge of the glass. Be sure the surface between the glass and the support ring are clean. The clear plastic washer is used between the top of the glass and the ring nut.

4A.6 The hopper gate opening and PC3 Feed Control adjustment should be set so that the turntable will not overload with product resulting in guide channel blockage. The Automatic Vibrator Feed Control (AFC) modification will prevent a turntable overload.

4A.7 It is not necessary to use the tablet guide, height guide and the capsule wire guide if the Air Guide System (AGS) is used.

SECTION 4B: RIM LOCATION ADJUSTMENT INSTRUCTIONS

Count accuracy depends on tablet trajectory after it falls from the edge of the glass turntable. It must fall through the scanner beam centerline, blocking the light from the red light emitting diode (LED) on one side of the scanner gap from the photocell on the other side. A tablet that falls off-center may not sufficiently block the light and may not be counted. Tablet trajectory can be adjusted so that the flow is through the scanner centerline, by turning the entire rim assembly CW or CCW. See 4B.4 Rim Locating.

4B.1 Scanner Centerline 2 small dots are machined into the top surface of the scanner end blocks. Each dot is centered over either the LED or the photocell. The scanner beam axis is in line with the dots. Tablets should fall between the dots. See Section 3, photo 12.

4B.2 Diverter Flag Centerline Factory adjusted, always lined up with the scanner centerline.

4B.3 Scanner Signal Display Panel (SS) Part of the front control door. A 10-segment bar graph display provides a visual indication of the scanner's photocell signal strength. An adjustment knob makes signal level adjustment possible. As product drops through the scanner beam the photocell signal momentarily decreases. Rim adjustments that achieve an ideal tablet trajectory through the scanner centerline are indicated on the SS display as the greatest decrease in signal. Older machines that do not have the SS panel on the control door have this display on circuit board #3 inside the control door.

4B.4 Rim Locating Techniques In order to be sure the rim is always installed on the TC machine in the same position, a sheet metal, fork-shaped fabrication is fastened to the rim. A pin is mounted in the machine top cover. As the rim is placed in position the fork always straddles the pin to correctly align the rim on the machine. The pin or fork location was slightly adjustable so that the rim position could be adjusted to put the product trajectory through the scanner beam centerline. There are two different pin/fork configurations, the old and the new arrangements.

4B.5 Rim Location Pin/Fork Located on the rim under the vibrator feed tray. The fork is attached to the rim. The pin is mounted on a threaded shaft supported by a bracket, attached to the TC top cover. The pin location can be changed by turning the threaded shaft. Adjustments can be made while the machine is being used. See Section 3, photo 3.

4B.6 Adjustment Procedure Observe the product trajectory. If it isn't falling between the dots on the scanner, adjust the rim relocation pin which will move the pin and the fork, causing the rim to pivot on the center hub. The knob should be loosened slightly while adjustments are made. When the trajectory is satisfactory tighten the hub knob again. (Rim center hub knob also known as rim hold-down knob.)

4B.7 Flow Corrector Guide Small wedge shaped guide that is located at the edge of the glass, at the point of product discharge from the guide channel. It will stabilize an erratic moving tablet or caplet as it leaves the turntable. In some cases use of the flow corrector will make a rim location change unnecessary. See Section 4.9 about use of this guide.

SECTION 5: THE AIR GUIDE ASSEMBLY (AGS) OPTION

The Air Guide System is a superior method of preventing product blockages at the beginning of the guide channel and for deflecting “piggybacked” pairs of product inside the guide channel. It consists of a manifold/nozzle assembly that attaches under the rim guide block through two attachment slots. The manifold assembly is fabricated with two different air input openings. The correct opening depends on the source of air. The pointed capsule guide is always used with the AGS option. The tablet guide, capsule kick-out wire guide and height guide are no longer necessary.

5.1 Air Source May be your already available compressed air source or the AS1 blower. The air must be low pressure, dry, clean, and regulated.

5.2 Using Your Air We supply a manifold with a 1/4 inch pipe tap threaded hole for a fitting of your choice. Your air should be regulated to less than 20 psi. Compressors create moisture by condensation and are often lubricated so filtering will be necessary.

5.3 Using the AS1 Air Supply We supply a manifold with a large opening suitable for our 1 1/4” air delivery hose. The AS1 regenerative blower is our recommended air source. It produces high volume, low pressure, low noise, generally cleaner air than does a compressor. We provide a stainless steel enclosure, a fuse, a power switch, and two paper element filters. Filter #1 cleans the air entering the blower inlet. Filter #2 cleans the air again as it leaves the blower to trap possible internal contamination. The AS1 filters should be checked regularly. See photo, Section 2.8.

IMPORTANT NOTE

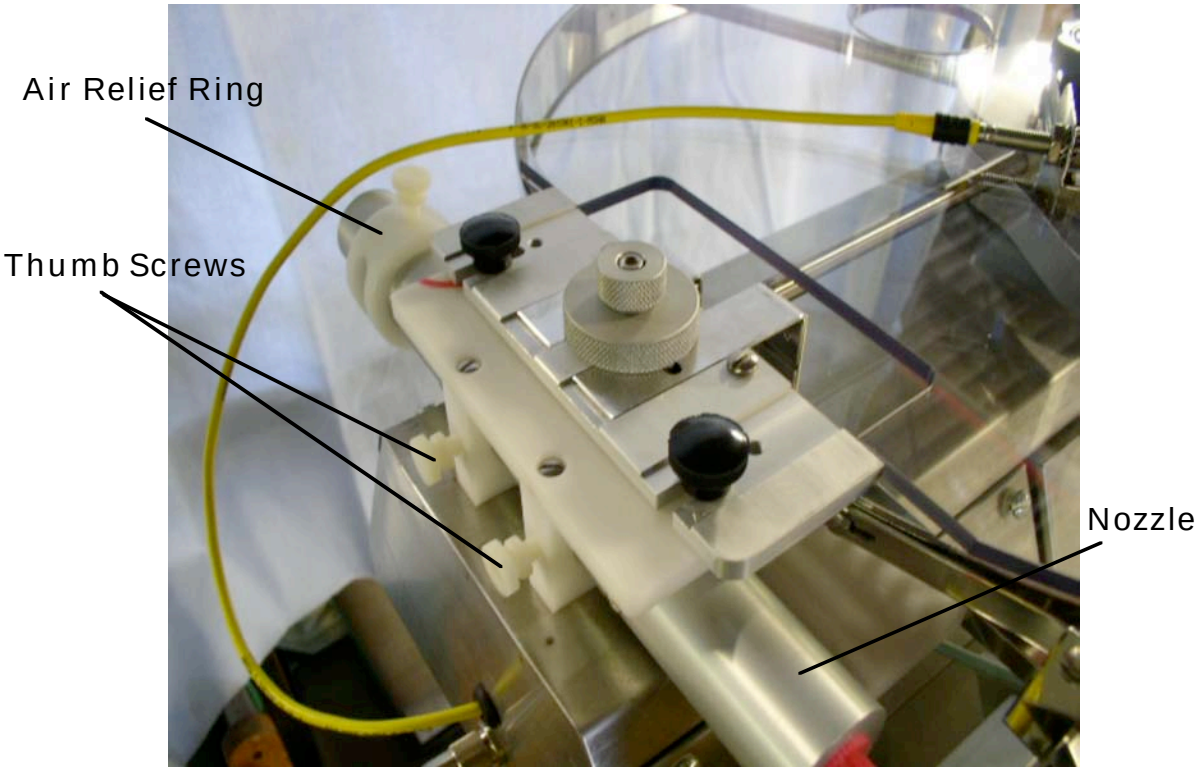
DEITZ CO. DOES NOT GUARANTY THAT THE USE OF THE AS1 BLOWER WILL NOT CAUSE CONTAMINATION OF PRODUCT. TO THE BEST OF OUR KNOWLEDGE AND RESEARCH, WE HAVE CONCLUDED THAT THERE IS NO MORE RISK BY USING THE AS1 WITH BOTH FILTERS THAN OCCURS WITH ANY PRODUCT EXPOSED TO ROOM AIR.

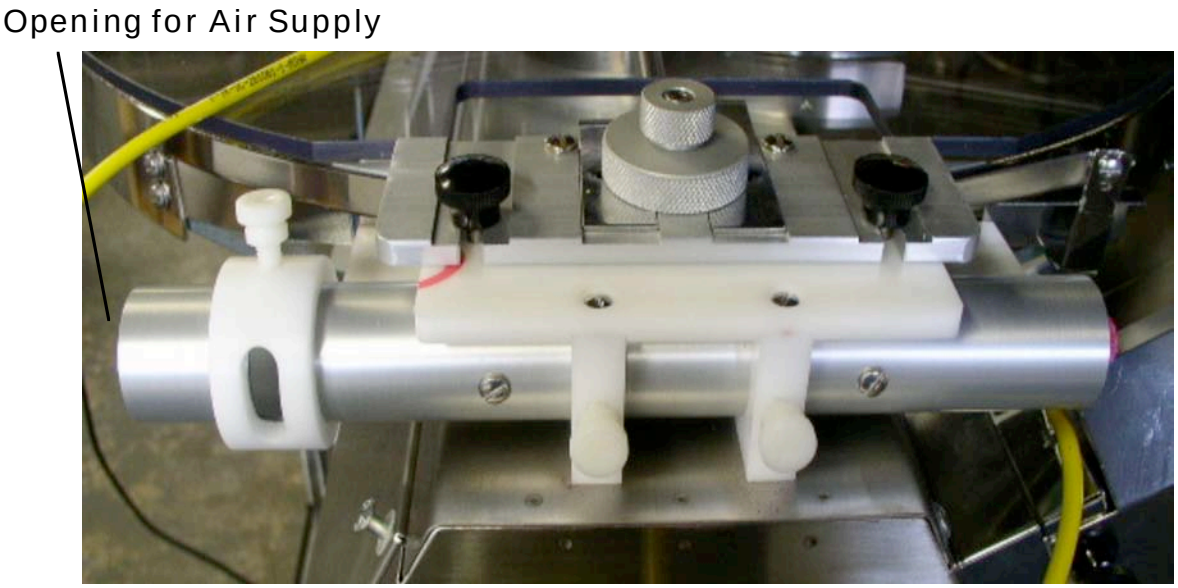
5.4 Air Guide Adjustments The nozzles must be as close to the slotted guide as possible and they should be low enough to blow away the top tablet or capsule when a piggybacked pair passes. A nozzle is too low if it causes the line of tablets to lift and “dance” as they pass the nozzle.

5.5 Keeping Blockages from Happening Most blockages are caused by odd shaped or rough caplets. The guide channel opening gets randomly hit by misaligned caplets. If a caplet hits the point of the AGS inner guide it will not climb up on the guide as we would like. Adjust the guide by loosening two screws in the support bracket. Adjust so

the point at the leading edge is close to the glass. The misaligned caplet will climb up on the capsule guide which will put it in the air stream of nozzle #1 and it will be blown clear of the guide channel. See Section 3, photo 14.

5.6 Do not use the height guide with the AGS inner guide because the AGS guide will interfere. You can use the capsule wire guide if heavy product is not moved by the air flow. The air will provide a force to push heavy product once the wire begins the process.





SECTION 6: EXTERNAL ELECTRONICS SET-UP AND ADJUSTMENT

6.1 Before Proceeding The following procedures are performed after the machine is mechanically set-up to properly handle the product. Load the hopper with product and adjust the product flow guides. All machines should be closed and secured.

6.2 Set the PC3 Dual Power Controller (Motor and Feeder Rates) With the main power switch ON, and the motor and feed knobs turned fully counterclockwise (CCW), turn on the motor switch and the feed switch. See photos, Section 2.1.

6.2a Ideal Rates Set the motor speed so that product is discharged at a rate that can be counted accurately. Adjust the feeder control so the product fills the turntable from the feeder at a rate in which the turntable is kept as full of product as possible without exceeding the rate at which the product is being discharged.

6.3 Set the DC3 Preset Counter Set the preset value for the total number of product to be counted into each bottle by putting the number on the decade switches below the display. Each digit may be changed from 0 to 9 by pressing buttons above and below each place. When the preset value is set , press RESET & LOAD PRESET. The counter will immediately load the number that is on the preset value switches.

6.3a Note: About the Preset Counter The DC3 loads the preset value into the counter each time the counter resets to zero. When the main power is turned on, the reset-to-zero function causes the existing preset number to be loaded. Also, when counting is taking place and the preset value is reached, the settings on the preset value are reloaded. Therefore, if the preset value is changed while the DC3 is counting, the counter will reset at the previous preset number and then load the new number for following counts. Always press reset after changing the preset value.

6.4 When to use the Center Overlap (CO) Also known as SRD on an earlier version machine. When counting opaque product, this feature is not used and the adjustment is turned fully CCW. The CO must be used for translucent products or products with a center hole. (For a CO theory explanation, see Center Overlap Information section below.) See photos, Section 2.1.

6.5 Setting the CO Adjustment With the TC running product at a rate slightly less than the maximum desired rate, turn the CO adjustment knob fully CW. The indicator light now should flash once for each piece counted. It may appear to be on continuously.

6.5a Slowly turn the CO adjustment knob CCW until the green CO indicator light is observed to flash nearly in sequence with the product passing through the scanner beam, one short pulse per capsule or gel cap.

6.5b Turn the adjustment slightly more CCW so the indicator light flashes once every few pieces. This indicates that the delay is sufficient to slightly overlap some products' entire signal, and therefore overlaps most of any product's signal.

SECTION 6B: SCANNER SIGNAL DISPLAY PANEL AD0985

The scanner signal display panel shows the quality and strength of the scanner signal, indicates when a count occurs, indicates when the center overlap delay is in effect, provides adjustment of the scanner signal strength and adjusts the amount of delay being applied to the scanner signal when center overlap is being used. Three small trim-pot adjustments are located on the backside of the panel which is accessed by opening the control door. These adjustments are called time delay, trigger point, and scanner LED intensity. See photo, Section 2.1D and Section 3, photo 15.

6B.1 10-segment Bar Graph Display Acts like a signal strength meter. It shows the scanner signal strength. When the 10th segment is lit the signal from the photocell inside the scanner is maximum. Signal strength depends on how much light from the scanner red LED light source falls on the photocell and on the adjustment located below the bar graph display. As pills fall through the scanner light beam they momentarily block the light from the photocell and the signal strength decreases very rapidly. Whenever the signal drops below the trigger point level (factory set at 5) the red LED to the left of the bar graph flashes and a count signal is sent to the DC3 counter. Dust accumulating on the scanner LED or photocell surfaces will reduce the signal strength. When this happens the scanner should be wiped clean.

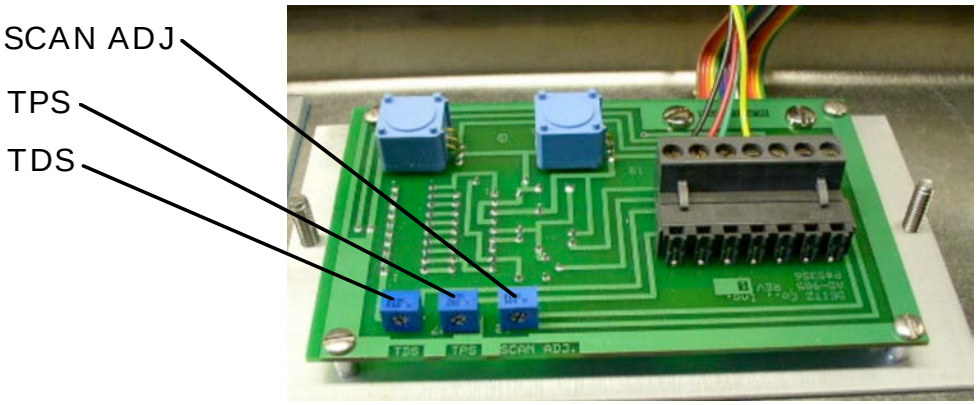
6B.2 Scanner Signal Strength Adjustment Located below the bar graph display. Adjust so both the 9th and 10th segment (9 1/2 setting) of the bar graph are lit at the same time when nothing blocks the scanner light beam. We suggest this setting because the 10th segment is the highest display possible but in fact you may have the signal strength adjustment higher than 10. By setting 9 1/2 you can see the signal strength is not excessively high and is in fact slightly less than 10. Small tablets and amber colored gel caps may count best at a lower signal setting because they do not block the scanner light beam as effectively as large tablets. Never set below 6.

6B.3 Clear Gel Cap Center Overlap Used only when clear gel caps are counted. Never use with solid (opaque) products. The green LED indicates when a special time delay circuit is rejecting a scanner signal that occurs too soon after a previous signal. We refer to the signal rejection as a time delay overlap. The signal we want to reject is the false signal caused by red light from the scanner LED passing through the center of a clear gel cap. As a gel cap falls through the scanner light beam the light intensity is reduced by refraction from the thick edge of the gel cap. At the moment the initial scanner signal occurs the time delay begins to function and any other signal that occurs while the delay is in effect will be ignored.

6B.4 Overlap Time Delay Adjustment Located below the green LED. Fully CCW is minimal delay. Keep the adjustment CCW for all opaque products. The green LED should not flash. For clear gel caps turn the adjustment CCW for all opaque products. The green LED should not flash. For clear gel caps turn the adjustment CW until the green light begins to flash as gel caps are passing through the scanner beam. This should

be the proper setting for whatever length gel cap you are counting. The adjustment numbers are for reference and mean nothing otherwise. Check bottle quantity before beginning production and make small adjustment changes based on test bottle count check. Generally speaking, under filled bottles mean the delay is too short. Over filled bottles mean the delay is too long.

Back Side Adjustments



Open the main control door to get access to these adjustments

6B.5 Time Delay Set (TDS) The diverter flag directs the flow of counted product from one fill station to the other shortly after the electronic counter registers the preset count value. The count signal is created by the scanner which is about 3/4" above the diverter flag range of travel. The diverter changes fill stations after a slight delay in order to compensate for the distance from the scanner to the diverter flag. Delay time is changed by adjusting the TDS trim-pot. Normally delay is minimal and the adjustment is almost completely CW. TDS adjustment procedures are explained below.

6B.6 Trigger Point Set (TPS) The scanner produces a signal proportional to the amount of light that falls on the photocell and the setting of the scanner signal strength adjustment on the front panel. When a pill falls through the scanner beam it blocks the light and causes the signal to drop. The signal must fall below the trigger level to produce a count signal. The TPS trim-pot adjustment sets the trigger point. We set the trigger point at 5. To set the trigger point, adjust the scanner signal strength adjustment to the front panel for a bargraph display of 5. Adjust the TPS until the red LED next to the bargraph is lit at a level of of 5 and is out at 4. After adjusting, return the scanner signal level to between 9 and 10.

6B.7 Scanner LED Intensity Adjustment Adjusts the red LED intensity in the scanner so that the bargraph display will indicate 9 1/2 when the front panel signal strength adjustment is at mid-range. The LED will dim slightly over time to this adjustment allows you to increase the LED intensity when necessary. Eventually the scanner LED will dim more than can be compensated for and must be replaced. If this happens, contact Deitz Co.

6B .8 TDS Adjustment Procedure Enter 5 in the counter register. Push reset. Line up 9 pills end to end in the guide channel. Note which bottle will be filled first. Set the motor speed at 5. Switch on the motor and let the 9 pills pass through the scanner into the bottles. You should have 5 pills in the first bottle and 4 in the second. If there are 4 in the first bottle the diverter needs more delay. If there are 6 in the first bottle the diverter has too much delay. You can change the number of pills used but never count fewer than half the number available because the diverter can not move two times in so short a time.

SECTION 7: AUTOMATIC VIBRATOR FEED CONTROL (AFC) OPERATION

Automatic Vibrator Feed Control turns the tablet feed vibrator on or off depending on the load of tablets on the turntable. AFC is a standard feature on new Pharmafill TC2s and an option on TC1 and older machines. Tablet counters without this feature delivered product to the turntable at whatever rate was selected. The glass turntable could be underfed or overloaded depending on how fast the product moved down the guide channel and was counted. AFC changes the feed function to deliver product as needed.

Components of the AFC

7.1 Deflector Guide The deflector guide is a spring loaded, 8" long blade that is attached to the center hub of the turntable rim. Its original purpose was to push product toward the outer edge of the turntable, in line with the opening of the guide channel. When a heavy load of product hits the deflector blade it pushes the blade in toward the center hub. Spring tension is adjustable. Tension should reliably push a light load of pills toward the turntable edge and should allow the blade to deflect toward the center under a big load. The tip of the blade can be bent to allow 2 rows of product to pass without deflecting the blade.

7.2 Target Block The target is a half-round metal block, mounted on top of the deflector shaft. When the blade moves toward the center hub under a heavy load, the target rotates at the top of the deflector shaft. A sensor aimed at the target detects this movement and will turn off the vibrator when the deflector blade moves past an adjustable limit. See Section 3, photo 13.

7.3 Sensor A proximity sensor detects the leading edge of the target block. The sensor must be very close to the target, approximately 1/8th inch. When the target is detected, a yellow LED locator at the rear of the sensor, lights. The sensor is 2 part: sensor head and cable. WE mount the sensor in a metal bracket that locates under the rim hold-down knob, on top of the rim cover (if used.) See Section 3, photo 13.

Using the AFC Function

7.4 Feed rate is adjusted on the PC3 control to deliver product at a slightly greater rate than it is being counted (overfeed.)

7.5 The target block is adjusted to control the AFC on/off function. To adjust the target the deflector blade must not be deflected (no pills pushing against the blade.)

7.6 Loosen the target block set screw. Move the target so the flat area is in front of the sensor. The leading edge of the round part of the target should be about 1/4 inch from the sensor. Be sure the target is directly in front of the sensor after the rim cover is installed. The sensor bracket is mounted on top of the rim cover.

7.7 The yellow indicator light at the rear of the sensor should be off. When the

deflector blade tip is moved about 2 inches in toward the center hub, the sensor light should go on. If the vibrator power is on you will see that the vibrator turns off when the sensor light is on.

Notes

*The deflector guide must move freely and not drag against the glass. Adjust the deflector bracket at the center hub as required.
*If the vibrator will not turn on, be sure the AFC sensor is not turning it off.
*Refer to drawings of the deflector adjustments located at the end of this manual.

SECTION 8:
PHARMAFILL TCA2/ABF2/DABF2/AS1/AGS
CLEANING PROCEDURE AND CONSTRUCTION MATERIALS

8.1 Cleaning procedure for Pharmafill Tablet Counters

The method used to clean the tablet counter must be based on the cleaning protocols that prevail at your establishment. Cleaning may not remove all traces of product. A machine used to count certain pharmaceutical products (ie: penicillin) that can cause a serious allergic reaction in a patient should be dedicated to only that product to prevent cross contamination. The following information is only suggested and may not be suitable for your operation.

a. Disconnect the machine from power before cleaning interior and exterior.
b. Small items can be washed in cleaning solution and hot water in a sink. Larger items that are not easily removed can be wiped clean with a cloth dampened with cleaning/disinfecting solution.
c. Use a cleaning/disinfecting product that has been determined to be most suitable for your application. A 50:50 water/alcohol solution is commonly used.
d. Use clean compressed air to speed the drying process. Otherwise dry with a cloth or paper towels.

8.2 Cleaning contact surfaces for product changeover

This procedure covers surfaces that have contact with the product. Refer tot he attached drawing. TC2-R and -L are similar. Disassemble the machine as shown but do not remove legs or bottle shelf. They are not shown for clarity.

a. Hopper: remove hopper door to clean door and surface under the door. Wipe down all surfaces of the hopper.
b. Vibrator feed tray and sieves: remove and wash sieve. Feed tray can be removed if desired or may be wiped down as installed.
c. Dust cup: wash in sink.
d. Rim assembly: although it can be removed and washed in a sink it is usually subjected to a thorough wipe down. Guides are removed and washed. Air guide nozzle is removed and washed.
e. Glass plate: wash thoroughly. The aluminum support ring should not be removed if glued to the glass plate. Wash the plastic washer and ring nut.
f. Scanner: do not wash the scanner in the sink. Wipe down surfaces. Prevent fluid from entering the scanner body.
g. Diverter head: remove and wash the sheet metal outer cover, inner plate (with slot to clear the flag), funnel holders, and funnels. Wipe down the diverter flag, the aluminum base through which the flag extends, and the machine surfaces around the diverter head.

8.3 General cleaning for non-contact surfaces

Always start the complete cleaning of the machine with Step 1.

a. While the contact parts listed above are off the machine or before cleaning with anything else, open the front control door and rear door. Use a cloth or a brush to wipe

or low pressure, <50 psi, compressed air to blow out dust and debris. Do not use cleaning solution inside the machine as a regular practice. Under very dirty conditions I can suggest a cleaning procedure if you contact Deitz Co. This part of the cleaning process will blow dust on all other parts, so do this first!
b. Wipe all exterior surfaces with a damp cloth. Do not spray from a spray bottle. Try to prevent liquids from dripping into the machine.
c. Carefully wipe down the DC3 electronic counter, PC3 power control panel and the scanner signal display panel. These electronic panels are especially susceptible to damage if liquids enter the preset count register or switches.
d. Dry with a clean cloth or paper towel.
e. Apply stainless steel cleaner /polish on non-contact surfaces to keep the machine looking good.
f. After cleaning, cover the machine with the vinyl cover.

8.4 Cleaning the AS1 Air Supply and AGS components

Disconnect the AS1 blower from power before cleaning.
a. Remove both air filters. Examine the output filter for dust and debris. Normally it is clean because the input filter has filtered everything. If the output filter is dirty the input filter is worn out or the blower impeller is wearing badly. Check to see why the output filter is dirty. Examine the input filter. One side should be dirty. Tap the filter on a hard surface to shake the dust out of the filter. If the filter is too dirty to successfully clean, replace it. Never interchange the input and output filters. The opposite side of each filter is contaminated.
b. Wipe down the AS1 stainless steel cabinet.
c. Air hose: if the filters are working correctly the air hose should be clean. If you want to wash the hose in the sink use soap and water. Dry by v attaching the hose back to the AS1 and turn it on. Be careful you don't drain water from the hose into the AS1 filter.
d. Air nozzle assembly: do not disassemble unless necessary. I suggest washing it as an assembly and using compressed air to blow it dry.

These are suggested procedures that should not be considered complete or suitable for every Pharmafill TC user. You are responsible for determining what cleaning procedure is necessary for your application.

CONTACT SURFACE MATERIALS:

Acetal Thermoplastic – NSF and USDA compliant. Meets FDA 21 CFR 177.2480 and ASTM D6100.
Stainless Steel Sheet Metal Fabrications – Type 304 – widely used form of stainless steel recommended for food processing equipment.
Stainless Steel Shafting – Type 303 – desired for machineability. Properties similar to Type 304.
Polycarbonate Thermoplastic Tubing – FDA compliant.
Glass plate – Lime glass. FDA Compliant.

SECTION 8A: SUGGESTED SPARE PARTS FOR PHARMAFILL MACHINES

TCA2 Tablet Counter

P2503	20” diameter glass plate- $165.00
P0118	AS1 air filters- $17.00
FM2199	Glass protection plastic ring- $2.00
FMA2515-2R	Capsule guide for TC2R- $33.00
FM2540-1	Scanner LED cover, all clear- $5.00
FM2540-100	Scanner photocell cover, masked- $10.00
AD1085	Full set of TC and ABF2 fuses (10 total)- $20.00

Explanation- The glass plate will break if dropped during cleaning. The AS1 filters will become too dirty to clean. The glass protection ring seems to get lost easily. It protects the glass plate from the ring nut. The capsule guide has a somewhat delicate weld that can snap if handled roughly. The scanner cell and LED covers are wiped clean frequently and will eventually scratch and need replacement. Fuses will blow out for various reasons.

ABF2 AC1 auto-index control, CV4.5 conveyor

P0142*	Electric air valve, Mead, part of AC1 and CS1- $61.00
FM3067F	Air cylinder bottle stop, Norgren, modified- $53.00
P1107 4.5”	Wide tablet top chain links (conveyor)- $17.00/ft
P5816*	Relay MK2PS24vdc, part of AC1 and CS1- $17.00
P1184	Conveyor rail splice links- $5.00

Explanation- The air valve will malfunction if there is dirt and moisture in the compressed air. Same applies to the bottle indexing air cylinders. The conveyor chain links can break. The relay contacts will eventually pit from use and require replacement. If you custom cut the conveyor guide rail you may need the slice links. (* indicates part is also used in other machines)

SECTION 8B: TCA2R/AS1 MAINTENANCE REQUIREMENTS

8B.1 The TCA2 should be cleaned according to your cleaning protocol prior to use. Use cleaning solution or diluted alcohol (and water) to wipe down all surfaces that have product contact.

8B.2 End of day Maintenance

1. Remove the AS1 input and output filters.
    a. Clean input filter by tapping the filter on a table top or use compressed air to blow dust out of the filter element folds. Input filter can be reused until it (1) noticeably restricts air flow (2) allows dust to pass through because it has a hole.
    b. Check output filter for dust. It should be clean. If not, dust must be passing through a hole in the input filter. Another source of dust on the output filter is potentially from a disintegrating AS1 impeller. If it is determined that the impeller is wearing out you must stop using the AS1. To date (3/30/05) an impeller has never failed.
    c. Never swap the two filters. Opposite sides are contaminated.
    d. Restricted air flow will make the output air warmer than usual.
2. Open the front and rear doors. Remove (blow out) accumulated product debris that falls into the machine through the door closure gaps. Blow debris off the circuit boards.
3. Check the scanner LED and photocell covers. The LED cover is clear. The photocell cover has a clear middle slot surrounded by a black mask. Clean the outside surface. If you see dust under the cover remove the cover and clean the underside as well. If you see dust on the LED or photocell use a fine brush to dust off the elements or use compressed air to blow off the dust. It should never be necessary to take the scanner apart. It is not recommended. Dust on the covers reduces the scanner signal level as displayed on the scanner signal display panel
4. Check glass plate for scratches, nicks and chips. If there is evidence of a chip and the glass is still usable, use a hand held, fine grit grinding stone to 'soften' the edges of the chip. This will show that the chip has been identified and treated and is not a new chip. Scratches occur when the guides are adjusted too low and they scratch the glass. Adjust the guides so they do not touch the glass.
5. Check the motor and glass support hub sprockets for integrity and proper belt tension. When the motor is off you should not be able to rotate the glass plate with fingertip pressure. If you can, the motor sprocket is loose.
6. Check the diverter flag movement and it's linkage located behind the diverter head assembly (inside the machine). The flag should move freely. If it is binding it will effect count accuracy. Be sure the flag shaft is not bent and the bushing through which it passes is clean. If the flag movement is not free call for assistance.
7. Check for loose hardware in these areas:
    a. Hopper door assembly
    b. Vibrator feed pan (two sieve hold-down screws)

c. Rim – guide channel assemblies.
d. Rim – inner hub lower band assembly
e. Rim – hub mounted deflector assembly (spring and hardware)
f. Diverter ahead assembly, deflector flag, funnel assembly

8. Be sure all door panels are tight before using the machine. If not the vibrating action of the feed pan will be compromised.
9. When cleaning the DC3 electronic counter panel do not allow liquid to drip into the switch assembly. It will damage the switch elements. Be sure the switch buttons will move the digits easily without binding.
10. There are no parts on the machine that require lubrication.

Turn on the machine prior to actual production and listen carefully for unusual noises while the motor and vibrator are set at half their range of adjustment. This can be the best indication of something that is not right. Listen for loose hardware and or guides that rattle, glass rubbing against the rim or against the guides. Look for smooth movement of the glass plate. The rim should not rise and fall as the glass turns (rubbing).

Recommended optional or replacement parts

1. Hopper Extension- doubles capacity of the hopper.
2. Glass Plate (20")- if the plate breaks during handling you can not operate.
3. AS1 Filters- must be replaced when the filter can no longer be cleaned or if a hole is found.
4. Capsule Guide- somewhat fragile and can break if bent too much.

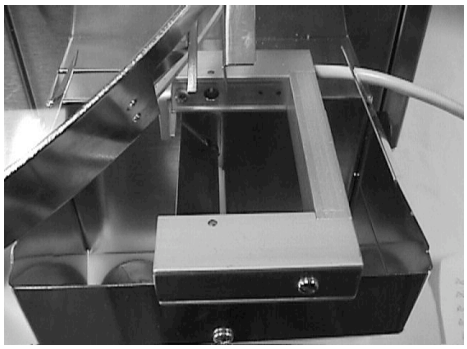
If you have a maintenance problem that is difficult to solve call Deitz Co. for assistance.
(732)681-0200

SECTION 9: TABLET COUNTER ADJUSTMENTS FOR ACCURACY

The tablet counter is designed to be accurate when used within the limits of its accuracy and when it is in good operating condition. In the following explanation, the term pills will include tablets, capsules, caplets, gel caps and examples of a solid oral dose type product in general.

TC1/TC2/TCA2 Operation Theory

The TC photoelectrically counts pills as they drop from the glass plate through a scanner. Count is accumulated on the DC3 electronic counter. When a preset number is reached the counter resets to 0000 and produces an output which operates the diverter head deflector flag. Pills drop into one of two filling stations depending on the position of the deflector flag.



1. A TC uses a photoelectric scanner to detect pills as they fall from the edge of the glass turntable plate. Pills must fall through the middle of a light beam emitted by a red LED light source. The light beam is aimed at a photocell that is located directly opposite the LED. The centerline of the beam is marked by two dots that are machined in the scanner. Each dot is precisely located above the photocell and LED. Pills must fall between the dots, as close to the centerline as possible.
2. The scanner signal is produced by the photocell. It reacts to the light from the LED which is carefully aimed at the photocell. If the LED is touched too hard it can be misaligned and may not be aimed at the photocell correctly. When the light from the LED is detected by the photocell there is a strong signal. When a falling pill blocks the light the signal drops significantly and a 'count' occurs. The intensity of the LED is controlled by a trim-pot adjustment inside the TC.
3. The electronic circuits that amplify and process the photocell signal are adjusted so whenever the signal drops below a certain threshold (trigger point) a single count is generated. The signal signal must return to a level above the threshold, before another pill passes the scanner. In other words the scanner must see a clear space between the pills falling through the scanner gap. Photocell signal amplification is controlled by the black knob located under the 'level' bargraph display on the front control door. The threshold is adjusted by a trim pot adjustment inside the TC.

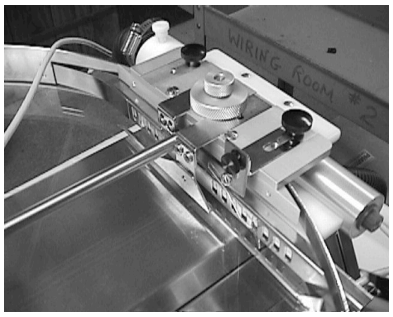
4. The photocell and the LED mounting blocks have a plastic cover. The LED side has a clear plastic cover. The photocell side has a masked cover which is mostly black with a clear strip in the middle. Covers are intended to keep dust off the LED and photocell. Dust reduces the light from the LED and will cause low signal problems. Clean the outside of the cover when dust accumulates. It may also be necessary to remove the cover and clean the area under the cover if you see dust under the cover. The masked photocell cover serves two purposes. It allows a narrow slice of the LED light beam to fall on the photocell. This makes the photocell responsive to small (narrow) spaces between pills as they pass through the scanner beam. A more responsive the photocell allows faster pill delivery and produces a more accurate count.

Important conditions that must be maintained

1. Pills must drop one at a time and there can be no side-by-sides or piggybacks. This is controlled by accurate guide channel width adjustment and height guide adjustment (or air guide nozzle adjustment when air guides are used).
2. Pills must drop as close to the middle of the scanner beam as possible. Adjust the rim location pin adjustment screw located under the vibrator feed tray, as required.
3. Pills must follow each other as they drop. If a pill appears to drop off to one side outside the normal flow, it may miss the scanner beam. Keep the guide channel width as narrow as possible and use the flow corrector guide (wedge) if necessary.
4. Turntable speed must not be higher than the accuracy-speed limitation. Test the TC with each different type pill to see what the fastest turntable speed will be for accurate counts. If the turntable is too fast the trajectory of pills leaving the glass plate will be too flat. The scanner will not detect the space between pills because a pill enters the scanner beam before the preceding pill leaves the scanner beam.
5. The scanner signal level must be kept above 7 and ideally at 9 when no pills block the scanner beam. A signal level below 7 may cause count problems.
6. The scanner signal level should drop to at least 3 when a pill is passing through the scanner. Ideally it will drop to 1 or 2. If it doesn't the pill is probably not dropping through the centerline of the scanner beam. Adjust the rim location pin to move the pill flow as required.
7. The diverter head deflector flag must move freely. If it feels tight, if it is bent or if it 'binds' at any point in it's movement, it will cause count problems.
8. The diverter head actuator delay must be adjusted correctly. This is an adjustment inside the TC and is initially made at the factory. If it is not adjusted right you will get one pill over and/or one under per bottle.
9. If you are not counting a clear gel cap, keep the clear gel cap center overlap fully CCW. You should not see the green LED flash. If the clear gel cap adjustment is turned CW and the LED flashes, you may be allowing pills to pass without being counted (overfilled bottles).
10. If you are counting a clear gel cap you must set the clear gel cap center overlap. If you do not set this adjustment you will get a substantially under filled bottle. Adjustment procedure is described in Section 6.

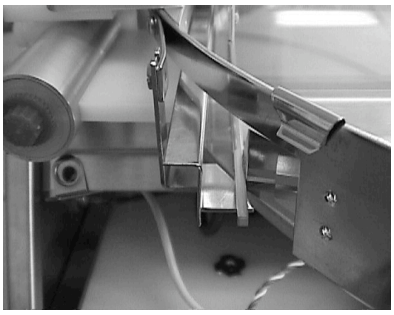
Adjustments

1. Scanner Keep the face of the red LED flush with the stainless steel inner cover of the diverter head. Loosen the scanner mounting screw to move the scanner. Keep the scanner in it's slot. Do not try to rotate the scanner to be at any other angle. Scanner signal should be at 9. Adjust the black knob below the level bargraph to attain a 9. If you can not get as high as 9 you should adjust the scanner adjust trim pot located on the backside of the scanner display panel inside the machine. It is labeled SCAN ADJ. If you still can't get as high as 9 call for assistance. See drawing below, or photo in Section 6B.



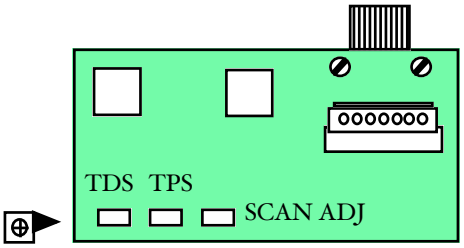
GUIDE BLOCK WITH GUIDES

RIM LOCATION ADJUSTMENT



FLOW CORRECTION WEDGE

2. Guides Located on the rim. Adjust the guide width to be slightly wider than the pill. They should be wide enough so that the pill never jams in the guide channel but not so wide the pill bounces from side to side. If you are using the height guide set it so it knocks off potential piggybacks. For capsules use the capsule kick-out wire to accomplish this. If some pills appear to fall off the glass and veer to one side, outside the scanner beam, use the wedge shaped flow correction guide to present a square edge to the pill where it drops from the glass. If all pills appear to drop to one side of the scanner beam adjust the rim locating pin under the vibrator tray to move the rim guide drop off point until they fall through the centerline of the scanner beam. Loosen the big black rim tightening knob (rim hub center) before making the adjustment.



Back Side Adjustments

3. Diverter Flag Delay Test This is the setup procedure. TC power on and motor and vibrator feed off. Put 7 pills end to end in the guide channel and set the speed at 5. Set a count of 4 in the DC3 counter preset register and push reset. Put bottles 1 and 2 under each fill station. When you turn on the motor switch the TC will deliver 7 pills through the scanner. The diverter will separate these pills into 4 in bottle 1 and then

switch the flow to bottle 2 where it delivers the last 3 pills. If you get 3 in bottle 1 you need more delay. If you get 5 in bottle 1 you have too much delay. The time delay set (TDS) trim-pot adjustment is located next to the scanner adjustment trim-pot inside the TC. Perform this test at least 10 times. You should get the same results every time. If you discover it fills correctly when the diverter flag begins with the left side and changes to the right but has an error when beginning with the right side and changes to the left, you have a diverter flag that binds in one direction. Call for advice.

4. Count Signal Threshold Adjustment Test TC power on. Adjust the scanner signal lever with black knob located below the bargraph display. As the level drops below 5 to 4 the red LED to the side of the bargraph will turn off. It turns on again when you raise the level back to 5. This shows the level at which the threshold is set. If the threshold must be adjusted the adjustment trim-pot is located next to the scan adjust and time delay set trim-pots inside the TC. It is labeled TPS.

5. Turntable Speed-Accuracy Test Set up the TC for accuracy. Begin the turntable speed at 5. Count 30 pills from the same bottle at least 10 times. The counter should show 30. Increase the speed to 5 1/2. Count the bottle contents 10X again. Continue raising the turntable speed in 1/2 increments until you get an error. This indicates the speed at which two pills appear to overlap one another to the scanner. There is still a space between the pills but the more horizontal trajectory is causing the overlap in the scanner beam. This is the upper limit of the pill delivery rate. The upper limit depends on pill shape and size. There are tricks that increase the rate. Call for tips.

6. Observation Watch the pills fall from the glass through the scanner beam (between the dots). Keep an eye out for piggy backs. Be sure there are none. Watch the pills fall straight down. If one or more veers out of the flow periodically, determine why. If the guide channel is too wide it will contribute to the problem. Use the flow corrector wedge guide if necessary. Adjust the rim guide location if necessary. Check the scanner signal level. Is it as high as 9 and does it drop at least below 3 when pills pass the scanner? If not check to see why it isn't.

Most of the count errors can be corrected. The usual error is overcounts - too many pills in the bottle. This is because one or more pills pass the scanner without being detected. If you get undercounts, one or more too few in the bottle, it is unusual. If you get an undercount in every bottle there is no good explanation. If you get a mix of one undercount and one overcount it is usually a diverter flag movement problem. Hopefully this information will help you understand the reason and solution for count problems.

PHARMAFILL TWO-YEAR LIMITED WARRANTY {New Machinery}

Deitz Company, Incorporated (Deitz Co.), manufacturer of the Pharmafill line of bottle filling equipment, warrants to the original purchaser that the machinery described below is free from material and workmanship defects. Deitz Co.'s sole obligation under this warranty shall be to provide without charge to the original customer, repair or replacement (at Deitz Co. option) of failed components or subassemblies, within two years from the date of delivery to the customer. The following limitations apply:

Warranty does not apply to: (1) any defect, malfunction, or failure caused by misuse, abuse, accident, or faulty installation (2) the glass turntable plate (3) machines not manufactured by Deitz Co. (ie. bottle capper or labeler) when they are specified, recommended, or installed as part of a bottle filling line assembled by Deitz Co. (4) electric motors and clutch assembly. The Pharmafill Two-Year Warranty applies when there is no other manufacturers warranty to consider. The warranty provided by the manufacturer of non-Pharmafill machinery (electric motors and clutch assemblies) supersedes the Pharmafill warranty. In most cases the other warranty periods are one year. All warranties require that the faulty component, subassembly or complete machine is returned promptly to Deitz Co., freight prepaid. Warranty replacement parts are shipped by next-day express service without charge to the customer.

Deitz Co. is not obligated by this warranty to reimburse a customer for any loss greater than the original price of the purchased Pharmafill machinery. A complete machine must be returned to Deitz Co. with prior approval to obtain reimbursement. A return/reimbursement request must be made within 30 days after delivery of the equipment. Freight charges shipping to and from the customer are the responsibility of the customer and are not reimbursed.

Warranty terms are suspended if the purchase and payment terms are not current or are not as described in the sales invoice rendered by Deitz Co. to the customer. A suspended warranty will be reinstated when payment or sale terms are complied with. Payment can not be withheld or postponed without advance approval by Deitz Co.

Customers Name & Address

Model and Serial No's

sample sample sample sample

Deitz Co. Signature_____Date_____

Customer Signature_____Date_____

(Customer should sign copy of this document and return to Deitz Co.,Inc.)