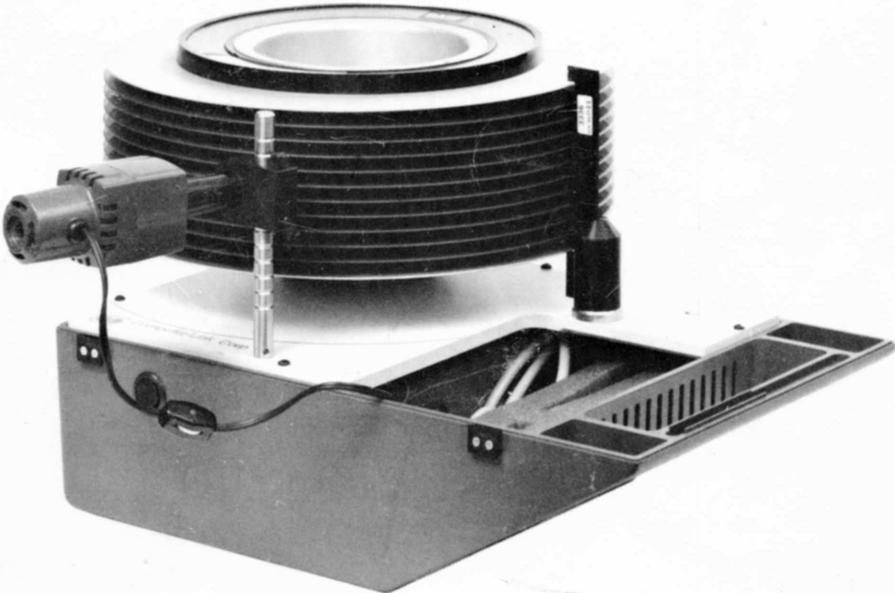


SERIES 600 COMBINATION DISC PACK INSPECTOR/CLEANERS



INTRODUCTION

Series 600 combination disc pack inspector/cleaners are precision instruments for manually inspecting and cleaning high-quality disc surfaces. Current models in the series include:

Model 651 for IBM 1316 Type Disc Packs
IBM 2316 Type Disc Packs

Model 661 for IBM 3336 Type Disc Packs
IBM 3336, Mod 11 Type Disc Packs

Model 665 for IBM 1316 Type Disc Packs
IBM 2316 Type Disc Packs
IBM 3336 Type Disc Packs
IBM 3336, Mod 11 Type Disc Packs

The Series 600 inspector/cleaners can be equipped with optional accessories to accommodate a wide range of disc packs.

Each inspector/cleaner is completely self-contained in a high-impact, plastic, portable carrying case. The only power required is 115/230 Vac, 50/60 Hz, 50 watts for disc surface illumination. The carrying case for the Model 665 is shown in Figure 1, along with the kit for the optional accessories.



Figure 1.

The Model 661 and 665 inspector/cleaners are provided with an adapter kit (Part No. 660-11) for double-density disc packs, IBM type 3336 Mod 11 or equivalent. The kit consists of three parts:

1. A spindle adapter (extender rod) that extends the effective length of the unlocking rod that actuates the spindle lock mechanism in the disc pack when it has been fully screwed down on the spindle. The adapter is easily installed or removed as required to permit inspection and cleaning of normal 3336-type disc packs.
2. A precision insertion tool (tweezer mechanism) to facilitate the installation and removal of the spindle adapter.
3. A surface location template. Because the surface numbers for the 3336 Mod 11 disc pack are different than the surface numbering sequence for the normal 3336 single density disc pack, a template is attached to the side of the Model 661 or 665 mirror assembly. This permits easy surface number identification of detected defects.

Each disc pack inspector/cleaner is designed to verify that the mechanical tolerances of all the disc packs continue to meet original manufacturer specifications. Primary functions of each unit are to permit the user to:

1. Check runout and other critical dimensions.
2. Clean individual disc surfaces.
3. Inspect disc surfaces for damage, dirt, and crashes.

PRINCIPLES OF OPERATION

Disc packs are written and read using flying heads which, except during loading, do not contact the disc surface. Flying of the heads is at 30 to 50 microinches off the disc surface. A particle of dirt, a ridge from a scratch, or an out-of-tolerance disc can cause the head to contact the disc surface (crash), resulting in costly equipment damage and reruns.

The inspector/cleaner is designed for quick inspection of the mechanical dimensions listed above. This is accomplished with a comb whose slot edges are located precisely at the outer tolerance limits. If the discs run within the slots, they are within tolerance. In those cases where disc runout is questionable or wobble is noticeable, a runout gage is provided for precise measurement.

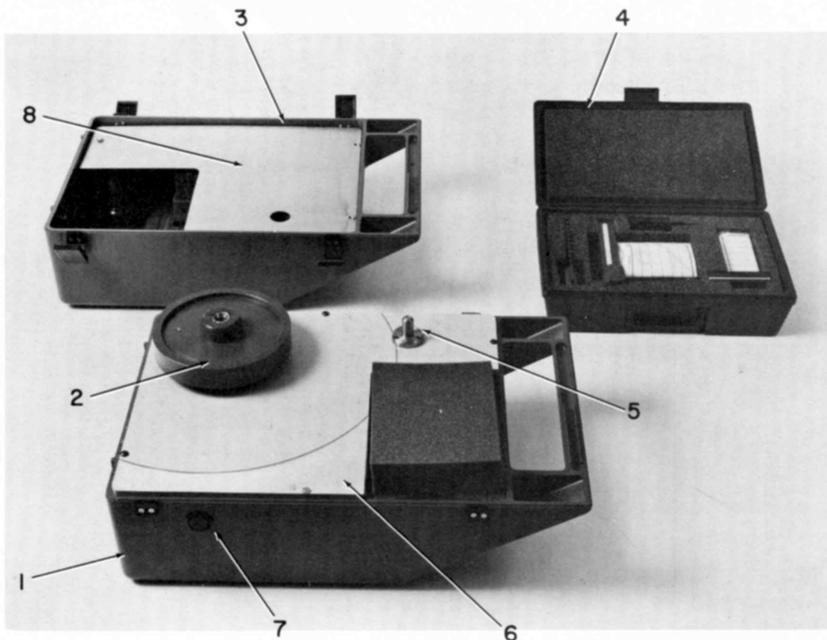
Once a disc pack is determined to be within the mechanical tolerances, the spindle may be rotated and the disc surfaces cleaned. The cleaned surfaces are then ready for visual inspection, using the mirrors and illuminator provided. Each mirror is numbered to identify the surface being viewed. The pack is slowly revolved and the surface inspected in the mirror. An audible signal indicates each complete 360-degree revolution of the disc. When rotating the pack, the trim shield is used; discs should not be touched except for cleaning.

Visual inspection of the surfaces will indicate areas of scratches, dirt, oil, head crashes or other surface damage which may cause recording problems.

UNPACKING

Model 665. — To unpack the Model 665 Inspector/cleaner, proceed as follows:

1. Place the case on a table (or flat surface) with the model number facing upward. Then unsnap the four latches, lift the top cover straight up, and carefully set the top cover on the table with the open side up (see Figure 2).



1. Base Unit
2. Spindle
3. Top Cover

4. Option Kit
5. Comb and Mirror Pivot

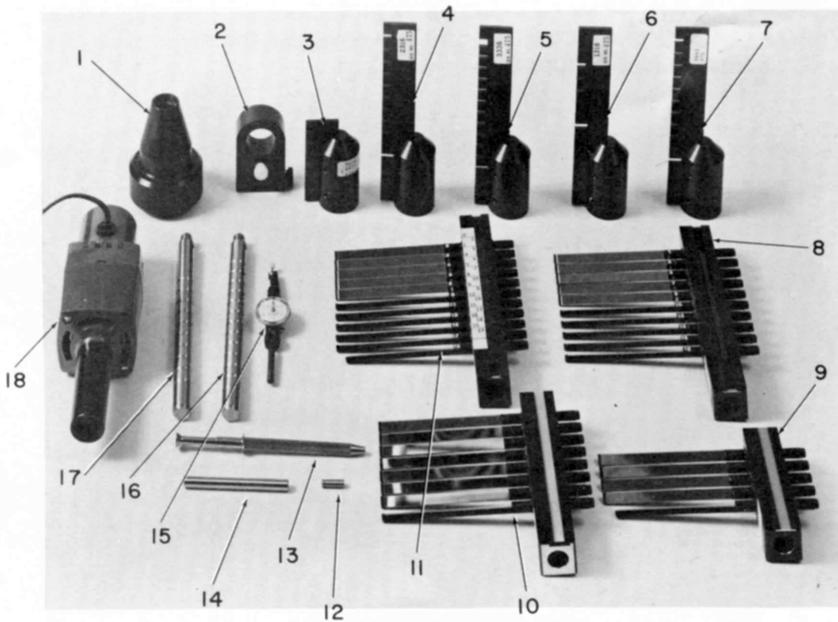
6. Deck
7. Spindle Lock Button
8. Storage Cover

Figure 2. Models 661 and 665

2. Loosen the thumbscrew that secures the storage cover to the top cover. Then remove the following components from inside the top cover (see Figure 3):

- 1 ea Instruction Manual
- 1 ea Mirror Assembly for 3336 Disc Pack
- 1 ea Mirror Assembly for 1316/2316 Disc Packs
- 1 ea Comb for 3336 Disc Pack
- 1 ea Comb for 2316 Disc Pack
- 1 ea Comb for 1316 Disk Pack
- 1 ea Bottle Alcohol (91% Isopropyl, 9% Water)
- 1 ea Cone Adapter for 1316/2316 Disc Packs

Note how each item is stored so that it can be replaced properly.



1. Adapter, Spindle Cone (1316/2316/8440—Type Packs)
2. Mounting Block, Runout Gage and Illuminator
3. Comb (Option F1)
4. Comb (2316—Type Packs)
5. Comb (3336—Type Packs)
6. Comb (1316—Type Packs)
7. Comb (Option F3)
8. Mirror Assembly (1316/2316—Type Packs)
9. Mirror Assembly (Option F1)
10. Mirror Assembly (Option F2)
11. Mirror Assembly (3336—Type Packs)
12. Adapter (3336-11 Type Packs)
13. Adapter Inserter (3336—11 Type Packs)
14. Wrench, Cone Adapter (1316/2316/8440)
15. Runout Gage
16. Post "A" (3336 and Option F1 Type Packs)
17. Post "B" (1316/2316 and Option F3 Type Packs)
18. Illuminator

Figure 3.

3. Remove the following components from the base unit (see Figure 3):

- 1 ea Post "A" for 3336 Disc Pack
- 1 ea Post "B" for 1316/2316 Disc Pack
- 1 ea Illuminator with Line Cord and ON-OFF Power Switch
- 1 ea Runout Gage
- 1 ea Mounting Block for Illuminator and Runout Gage
- 1 ea Wrench for 1316/2316 Cone Adapter
- 1 ea Adapter for 3336 Mod 11 Disc Packs

As before, note how each item is stored so that it can be replaced properly.

4. The separate option kit for the Model 665 inspector/cleaner is capable of storing accessories grouped and identified as F1, F2, and F3. If option F1 is the only one selected, its components are stored in the top cover. Any other combination of options F1, F2, and F3 is stored in the kit container.

Model 661. — Instructions for unpacking the Model 661 inspector/cleaner are similar to those for the Model 665 except that the 661 contains components only for the checking of 3336 and 3336-Mod 11 packs.

Model 651. — Instructions for unpacking the Model 651 inspector/cleaner are similar to those for the Model 665, except that the 651 contains only components for checking 1316— and 2316—type disc packs. The spindle on the 651 is cone shaped as illustrated in Figure 4. Note the difference between this spindle and the one on the 661 and 665.

- 1. Deck
- 2. Spindle
- 3. Base Unit

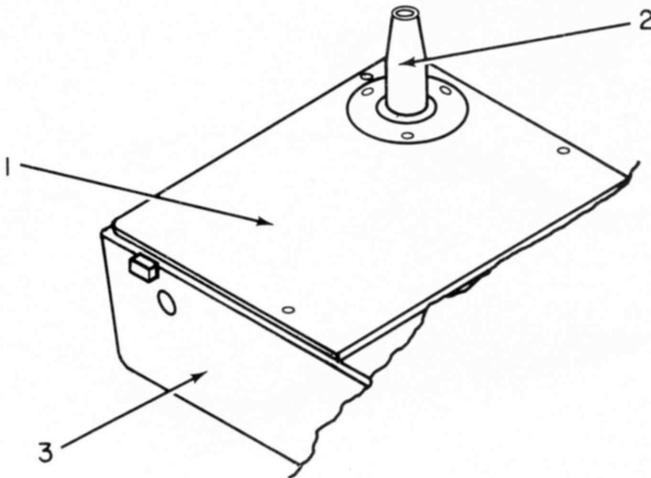


Figure 4. Model 651

LOADING OF DISC PACKS

3336 Disk Pack. — Proceed as follows:

1. Use the spindle as shipped. Hold the pack upside-down, release the bottom cover from the pack, and set it aside.
2. Turn the pack over, keeping your free hand under the pack to avoid accidental dropping.
3. Place the pack over the spindle and carefully lower it onto the spindle base. Align the outer edge of the pack cover with the curved line on the deck as a guide for proper alignment. Make sure the pack is seated squarely.
4. Press the spindle lock button on the side of the case and rotate the cover clockwise until the disc is firmly locked onto the spindle as shown in Figure 5.
5. Remove the top cover, wipe it clean, and set it aside.



Figure 5.

3336 Mod 11 Disc Pack. — Instructions are similar to those for the 3336 disc pack. To release the cover, it is necessary to use the adapter inserter to drop the adapter into the spindle, over the pin, as shown in Figure 6. Then proceed to load the pack as described previously. When finished, use the same inserter to remove the Mod 11 adapter.

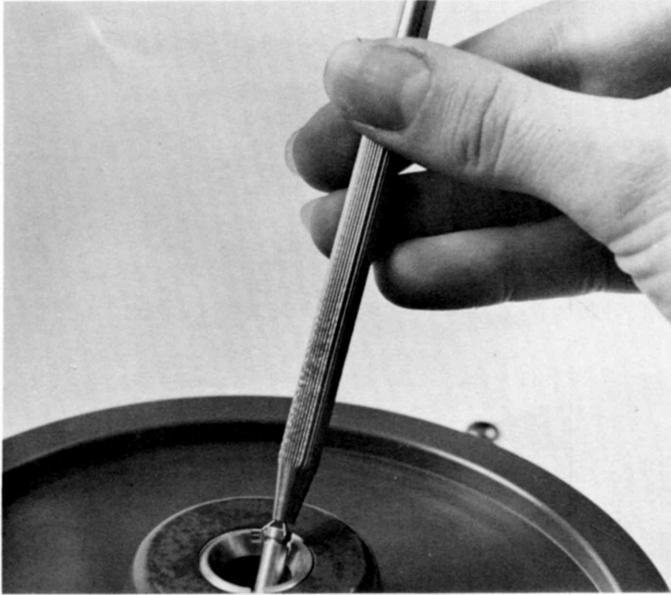


Figure 6.

1316/2316 Disc Pack. — Proceed as follows:

1. Unscrew the cone adapter from the nut in the cover and thread into the spindle, finger-tight. Then use the supplied wrench for tightening the cone adapter, until firm. (Too much pressure will make disassembly difficult.)
2. Hold the 1316 or 2316 disc pack upside-down. Unscrew the bottom cover from the pack and set it aside. Wipe off the inside of the cone. If there is any sign of dirt, or if the filters are darkened, replace the filters.
3. Set the bottom piece aside and turn the pack over, keeping your free hand under the pack to avoid accidental dropping.
4. Place the pack over the spindle and carefully lower it onto the cone adapter. Align the outer edge of the pack cover with the curved line on the deck as a guide for proper alignment. Make sure the disc pack is seated squarely.
5. Press the spindle lock button on the side of the case and rotate the cover clockwise until the disc pack is firmly locked onto the spindle.
6. Remove the cover and set it aside.

DISC TOLERANCE INSPECTION

With the disc pack mounted, install the appropriate comb on the pivot as shown in Figure 7, and carefully swing the comb into the discs. Then manually rotate the disc pack and observe the clearance in the slots. (Dimensions for the various disc packs are shown in Figures 8, 9, and 10.)

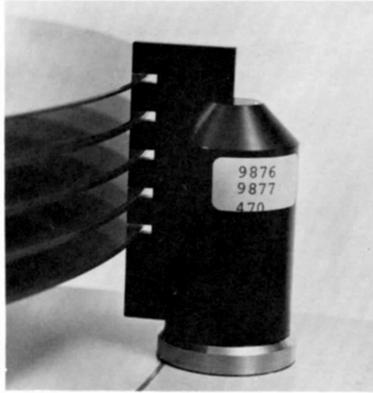


Figure 7.

NOTE: Use the trim strip for rotation, not the discs. First watch the discs for conformance within the slots. No disc edge should touch the comb edges. If it does, the disc is out of allowable tolerance. If in doubt on a disc which appears to wobble, use the runout gage for checking.

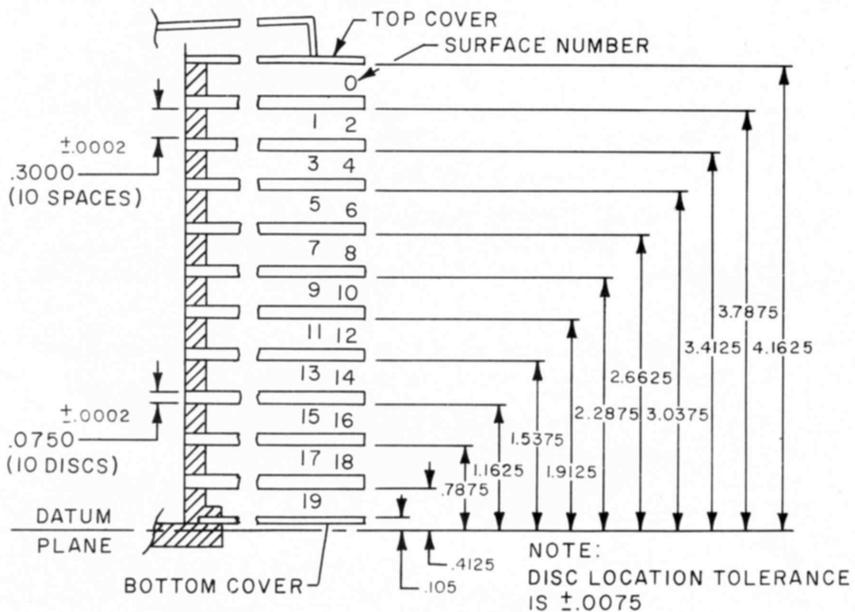


Figure 8. Dimensions for 3336 Disc Pack

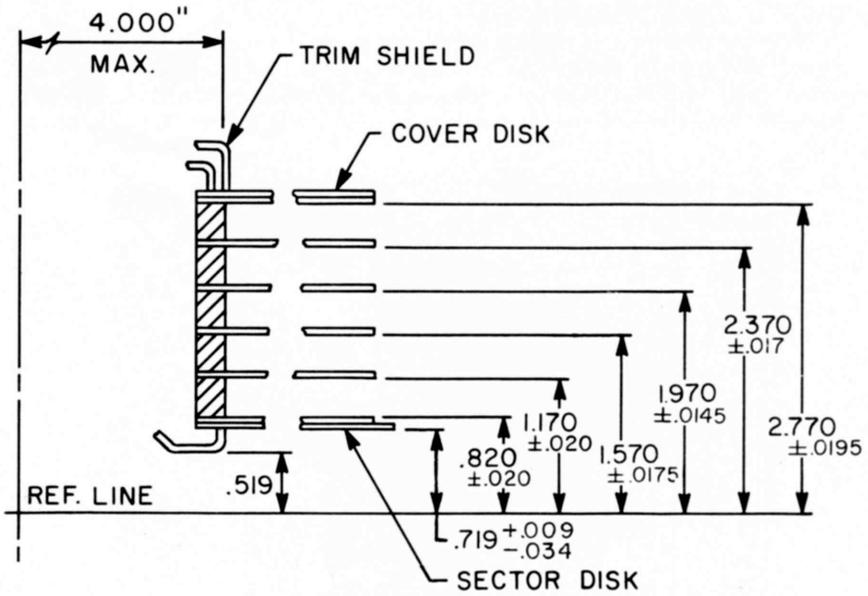


Figure 9. Dimensions for 1316 Disc Pack*

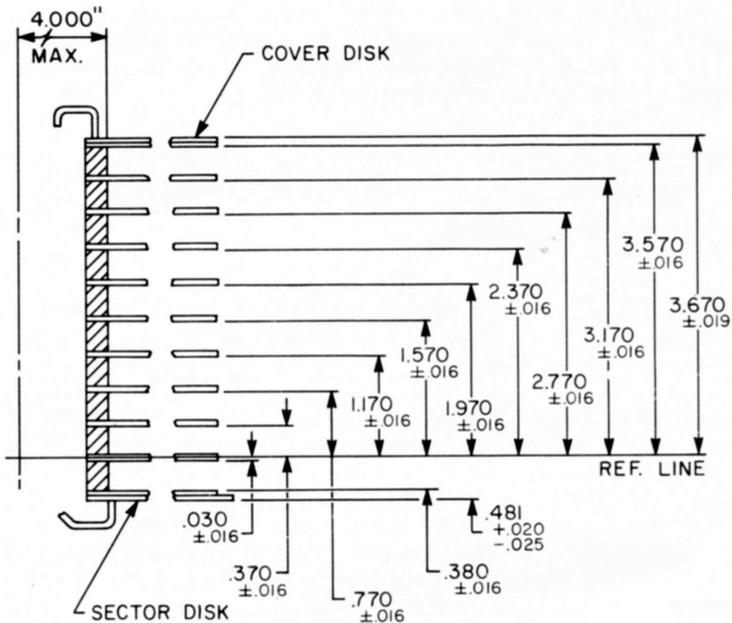


Figure 10. Dimensions for 2316 Disc Pack*

*A maximum axial runout of 0.012" T.I.R. measured at 13.500" dia +/- 0.25" dia is permitted, within the tolerance limits, when the disc pack is rotated at 2400 RPM. Maximum axial runout of sector disc is 0.020" T.I.R. within the tolerance limits, when the disc pack is rotated at less than 10 RPM.

RUNOUT GAGE

To check disc runout, proceed as follows:

1. Insert the appropriate "A" or "B" post in the hole in the deck, as illustrated in Figure 11.

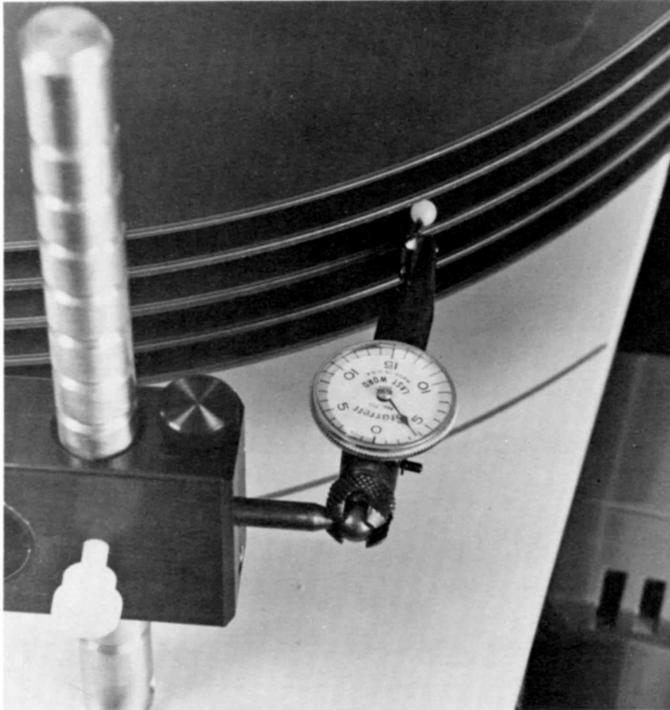


Figure 11.

2. Slide the mounting block onto the post until a detent is felt. Then, using the white nylon thumb screw, secure the mounting block to the post.
3. Insert the runout gage in the hole in the side of the mounting block and secure to the block, using the metal thumb screw at the top of the block.
4. The nylon ball at the tip of the runout gage should ride about 1/4-inch into the surface of the disc being tested. Press the ball against the disc until the gage is deflected approximately half scale.
5. Manually rotate the disc pack and observe the runout gage. The reading should not exceed tolerances shown on pages 8 and 9.
6. To check another disc, loosen the white screw and swing the block and gage outward. Raise or lower the block and gage until a detent is felt, then swing the block and gage inward, and repeat the procedure above.

CLEANING

If the discs have dirt on them, they should be cleaned. For IBM types 1316 and 2316, wrap a lint-free soft cloth or non-woven fabric around the cleaning paddle supplied. Moisten the paddle with 91% isopropyl alcohol (9% water) or other approved cleaner. Clean each surface, as necessary, by inserting the paddle and slowly rotating the disc pack, as illustrated in Figure 12. Then use a dry cloth or other suitable fabric for wiping the surface dry.

For IBM 3336-type packs, follow the same procedure as for 1316/2316-type packs except that, if possible, the discs should be cleaned dry (no cleaning solution).

When cleaning the discs, it is useful to slide the illuminator into the mounting block on the post holding the runout gage. Apply power to the illuminator by setting the power ON-OFF switch to the ON position. This facilitates visual inspection of the surfaces being cleaned.



Figure 12

SURFACE INSPECTION

To inspect the disc surface, proceed as follows:

1. Remove the comb and install the appropriate mirror assembly on the same pivot. Make sure the individual mirror surfaces are clean (see Figure 13).
2. Slowly swing the mirror assembly into the pack. Be sure there is no contact between the mirror and the disc surfaces. If there is, check that the correct mirror assembly has been installed and is seated correctly.

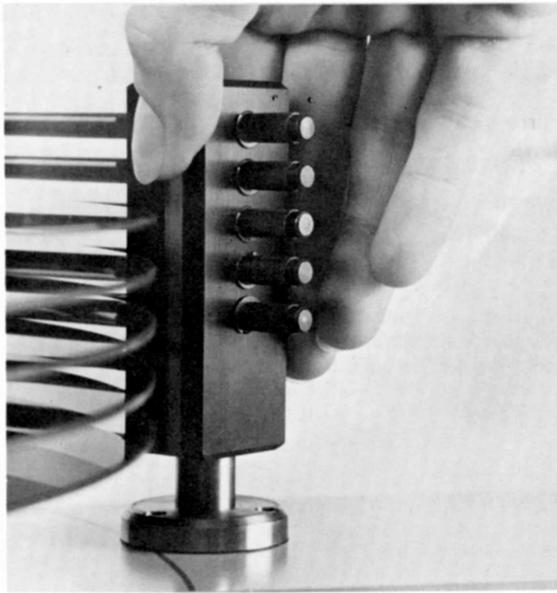


Figure 13.

3. With power applied to the illuminator, align the illuminator with the opening in the surfaces to be checked as shown below.



Figure 14.

4. Observe the disc surfaces in the mirrors by looking in-between the discs. The numbers on the mirrors identify the surfaces of the disc being viewed.
5. The mirrors have two 45-degree detents so that they can be positioned for viewing both top and bottom surfaces of discs. When a defect is noted, it is sometimes useful to rotate the mirror 1 or 2 degrees for a slightly different angle view of the defect.
6. While slowly rotating the disc, inspect each disc surface reflected in its associated mirror. An audible ping sound will be heard when a 360-degree rotation has been made. In addition, the mirror arms have scribe lines on the back to serve as guides in locating the tracks. These scribe lines are at ½-inch intervals. On the 3336 disc, these lines correspond to the location of tracks 0, 100, 200, 300, and 400.

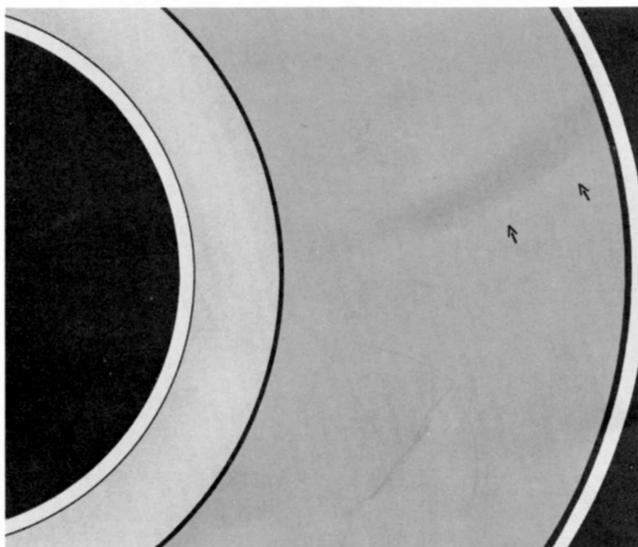
Small marks or scratches on a disc surface can cause loss of data and may even lead to head/disc interference (crashes). Carefully inspect each surface and judge whether or not any imperfections will cause damage to the heads or packs.

Disc surface imperfections fall into three categories:

1. Visible coating irregularities (usually are no problem).
2. Possible magnetic errors.
3. Mechanical defects likely to cause head/disc interference (HDI).

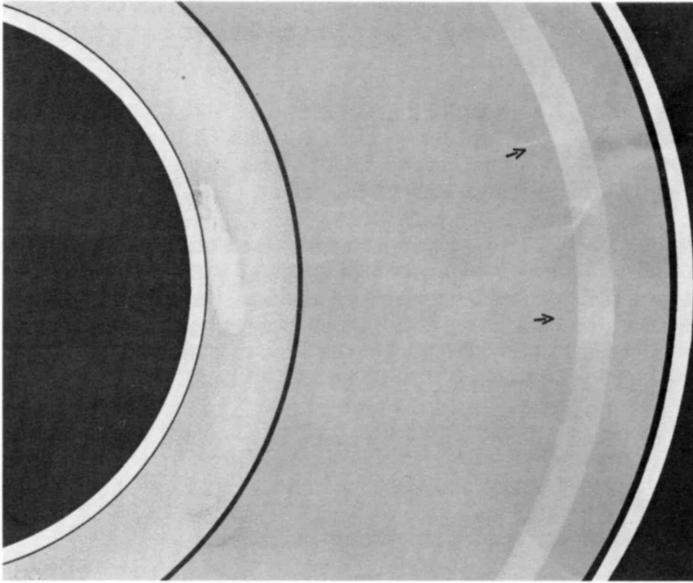
The defects likely to cause head/disc interference can be the most costly in head or pack damage in reruns.

The following photographs give examples of common types of mechanical disc surface imperfections and damage.



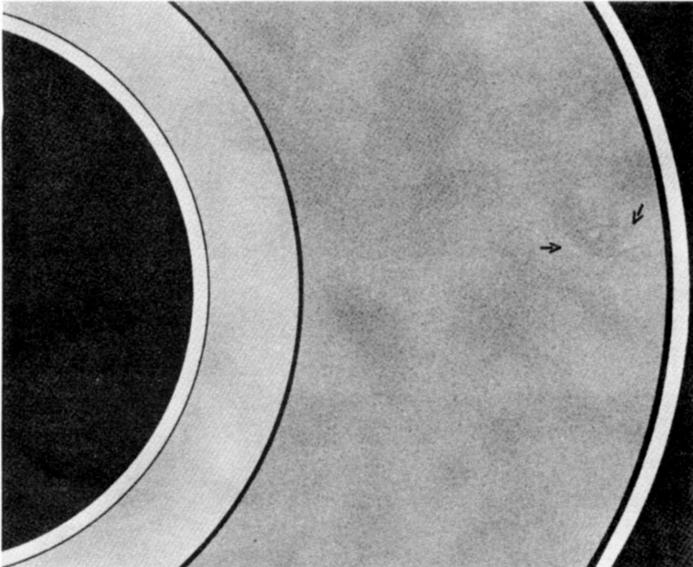
LAPPING SCRATCHES

These are color or surface texture variations caused by the manufacturing process. These do not present a problem, either magnetic or mechanical.



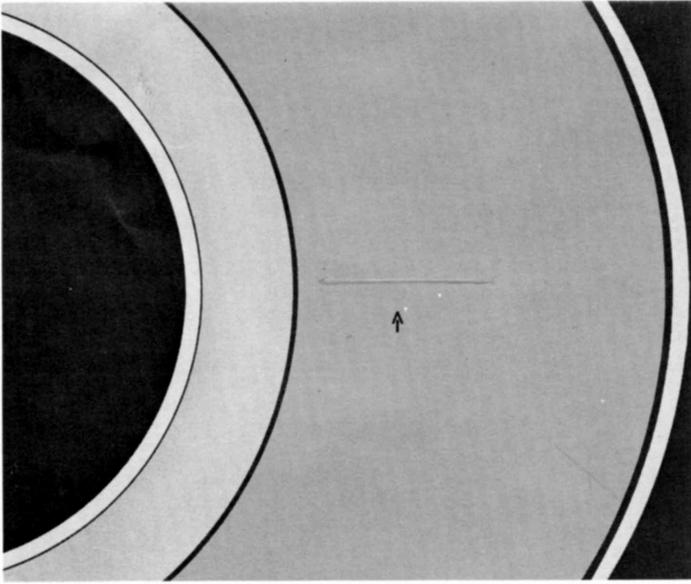
SURFACE TEXTURE

Bands of different surface texture or color which are smooth and blend in with the rest of the surface are not a problem.



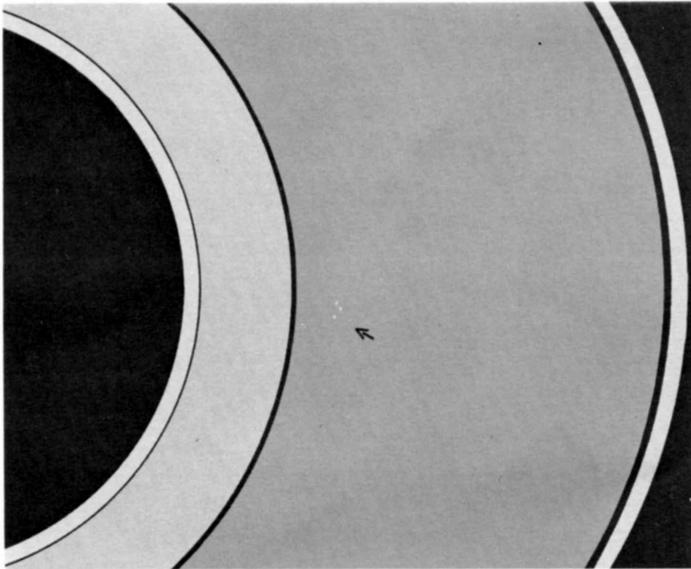
HEAD LOAD MARKS

Head load marks are caused by momentary contact by the head when loading or unloading. They are small, circular, light, shiny spots. They present no problems.



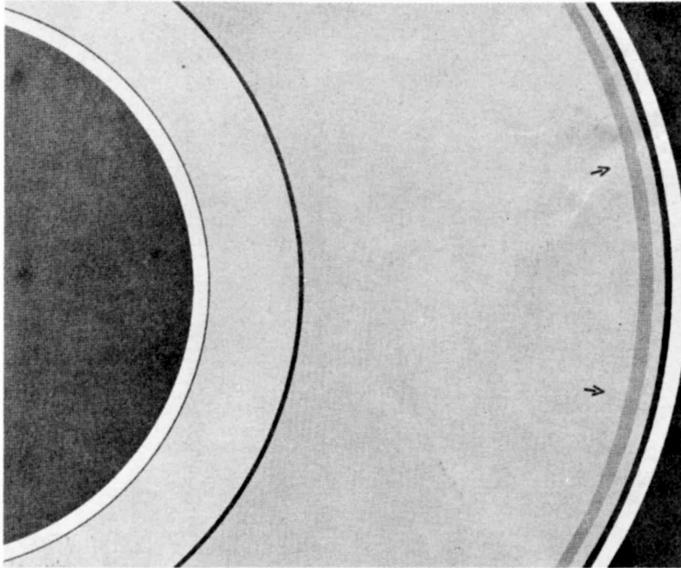
COATING RUN

This is a streak in a radial direction. It will not cause mechanical problems. However, it could cause magnetic errors. On a tested pack, one can assume this has already been checked.



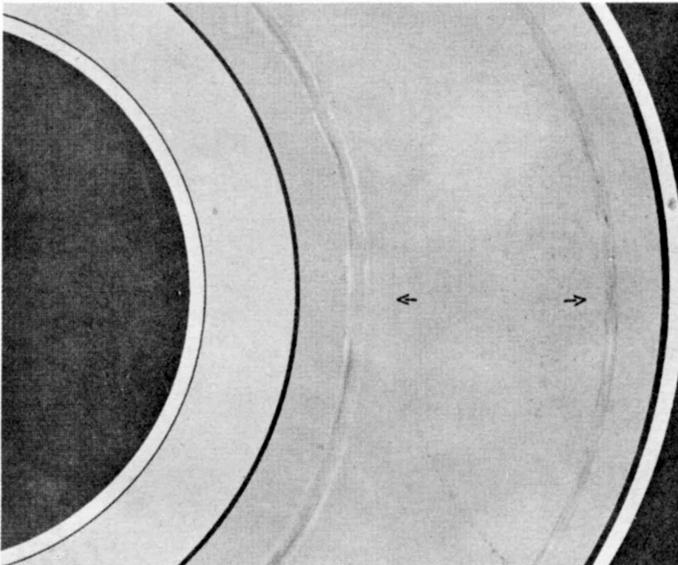
PINHOLES

Tiny holes in the coating should be inspected carefully. If the diameter is less than 1/32-inch, and if there is no bare aluminum showing, the holes should not cause problems.



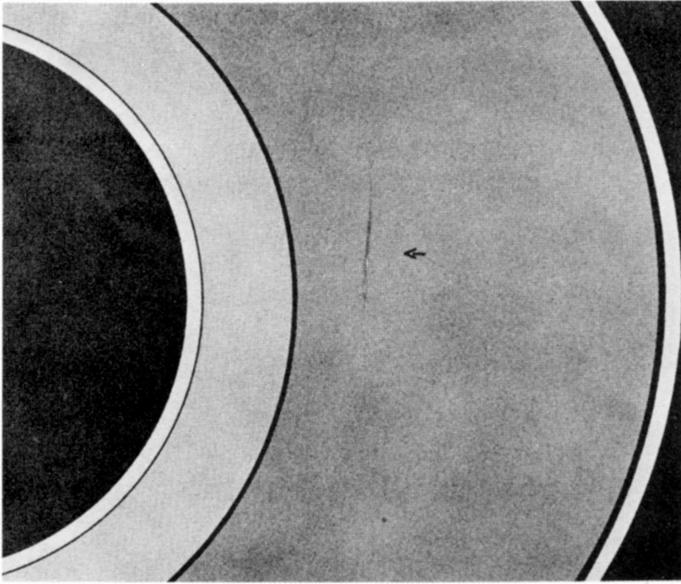
BURNED COATING

Prolonged head/disc contact will discolor the coating due to the heat generated. This can cause small ridges on the disc surface which do create a hazard.



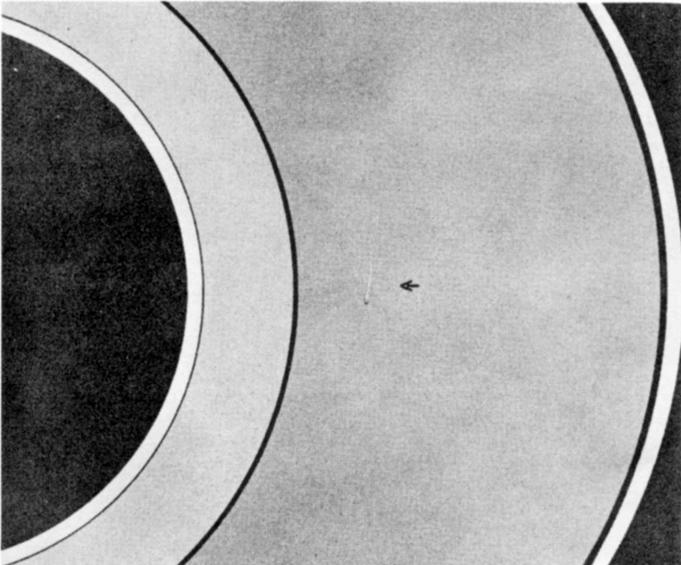
DULL BANDS

Multiple scratches or dull bands caused by head contact cause surface roughness which can collect contaminants and can cause further head/disc interference.



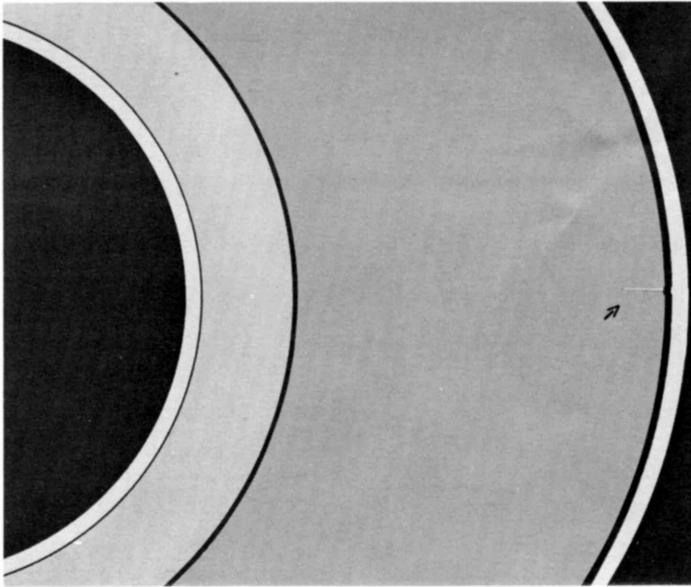
SCRATCH WITH VISIBLE ALUMINUM

A scratch deep enough to reach the aluminum can cause ridges which result in head/disc interference unless the scratch is very small and there is no indication of protrusion above the polished surface. The disc should not be continued in service.



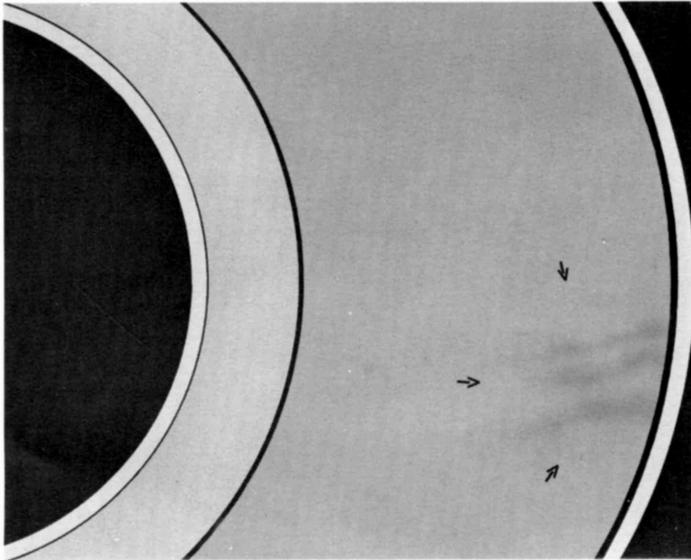
COMET TAIL WITH VISIBLE ALUMINUM

This results from the head hitting a small particle on the surface. The particle or the coating may protrude above the surface and should be considered a hazard.



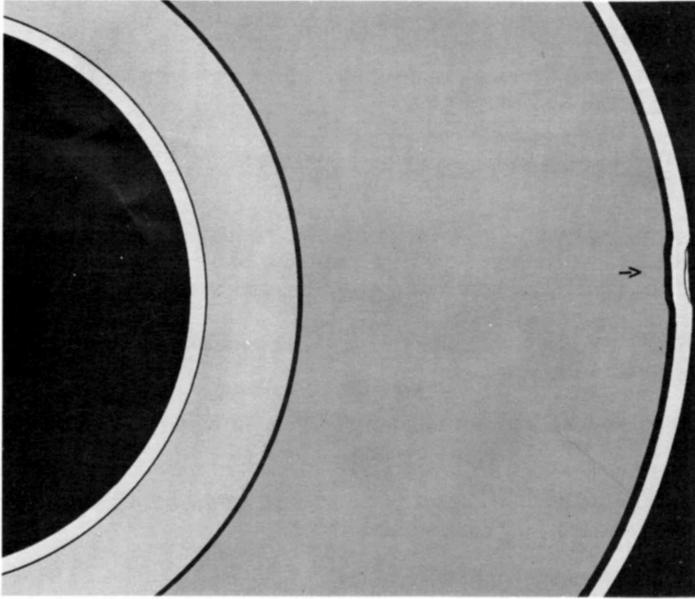
NON-HEAD TYPE SCRATCH

A scratch caused by external means which penetrates to the aluminum is a hazard.



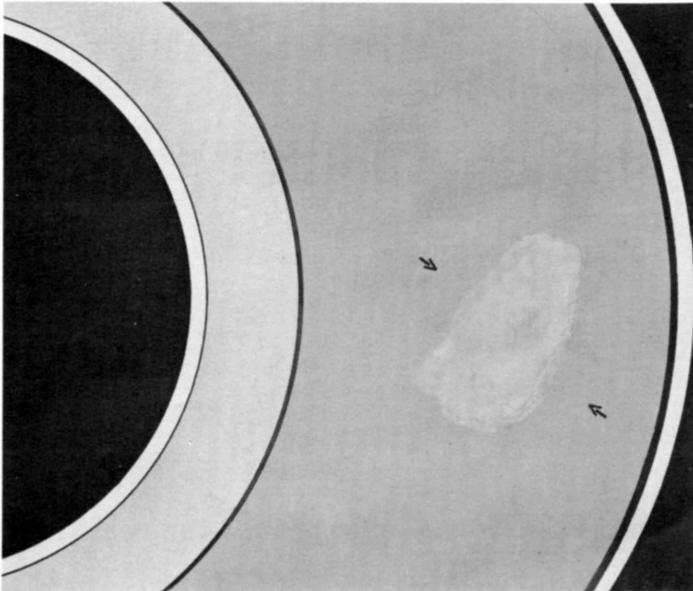
RIPPLES OR POCKETS

Ripples, unpolished areas, and surface depressions can cause head flying problems resulting in head/disc interference.



EDGE DAMAGE

Edge damage which causes distortion of the edge is a potential problem.



ALCOHOL RESIDUE

Alcohol used to clean disc surfaces must be wiped dry. Alcohol acts as a solvent and carrier for the dirt and oil on the disc surface. If not wiped off, the dirt and oil will tend to concentrate in one area as the alcohol evaporates, causing a potential hazard from the residue. Careful cleaning and wiping dry will probably remove this residue.

UNLOADING

To unload an inspected cleaned pack, proceed as follows:

1. Rotate the mirrors away from the discs and remove the complete mirror assembly from the deck.
2. Clean the inside of the protection dust cover and then place down over the pack.
3. Press in the spindle lock button on the front of the case and rotate the cover handle counter-clockwise until the pack is free of the spindle. A snap, or click, will be heard when it comes free.
4. Lift off the pack, keeping free hand under pack to avoid accidental dropping.
5. Turn pack over and put bottom cover on to completely protect pack.

PACKAGING

Make sure all parts are repacked as originally shipped. Cover mirror surfaces with covers provided to avoid scratching.

OPTIONS FOR MODEL 665

The basic Model 665 will check IBM 3336, 3336 Mod 11, 2316 and 1316 packs or their equivalents. If equipped with optional adapters (F1, F2, F3), the 665 can also be used for inspecting and cleaning additional packs.

CROSS-REFERENCE TABLE

	<u>IBM</u>	<u>CDC</u>	<u>Univac</u>	<u>Cal-Comp</u>	<u>Burroughs</u>	
Basic Model 665	{	1316	9849	—	—	—
		2316	9869	—	—	—
		3336	9879	8433-00, -01	—	—
		3336 Mod 11	9882	8430, 8433 -02, -03	—	—
Option F1	{	—	9876	—	—	205, 206
		—	9877	—	—	—
		—	—	—	Trident	—
Option F2	{	—	—	8416	—	—
		—	—	8418	—	—
Option F3	—	—	8440 with 0.075" discs	—	—	

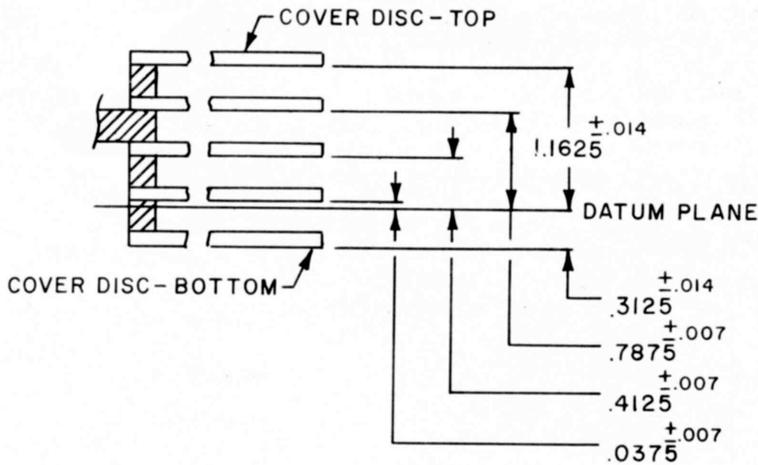
Special instructions for the three options are provided below.

CDC 9876

Mount directly on spindle. Use short comb and short 5-mirror assembly for inspection.

CDC 9877

Insert Mod 11 adapter onto spindle. Use short comb and short 5-mirror assembly for inspection.



CDC 9876 and 9877 Dimensions

CAL-COMP TRIDENT

The Cal-Comp Trident is similar to a 3336 pack with the top 7 discs removed. Use Mod 11 adapter and 3336 comb. The discs will run in the lower 5 slots of the 3336 comb. Use the short 5 high mirrors, labelled F1.

UNIVAC 8416

If the Model 665 has the Univac 8416 option, the 8416 pack can be inspected using the 3336 comb and the special mirror assembly labelled F2.

NOTE. — If the unit does not have the Univac option, the 8416 cannot be loaded onto the spindle.

UNIVAC 8418

If the Model 665 has the Univac 8418 option, the 8418 pack can be inspected using the 3336 Mod 11 adapter in the spindle with the 3336 comb and the special mirror assembly labelled F2.

NOTE. — If the unit does not have the Univac option, the 8418 cannot be loaded onto the spindle.

UNIVAC 8440

Mount on the cone adapter provided for the IBM 2316. A special comb labelled F3 is provided. Use the IBM 2316 mirror assembly.

SPARE PARTS LIST

ITEM	MODELS			PART NUMBER
	651	661	665	
Adapter, Inserter (MOD11)		x	x	1128
Adapter, Pin (MOD11)		x	x	1038
Adapter, Spindle Cone, 2316—Type Packs			x	10515
Bulb, Illuminator G.E.	x	x	x	1460
Case	x	x	x	14-1002
Comb, 1316 Assembly (665)			x	10520
Comb, 1316 Assembly (651)	x			14-1024
Comb, 2316 Assembly (665)			x	10522
Comb, 2316 Assembly (651)	x			14-1023-02
Comb, 3336 Assembly		x	x	10523
Deck	x	x	x	14-1000
Illuminator, Complete A/O	x	x	x	364A
Line Cord GRA	x	x	x	2W050
*Mirror	x	x	x	10467-1
*Mirror (No. 19 only)		x	x	10467-2
Mirror Arm (Specify Arm No.	x	x	x	10733
Mirror Arm (No. 19 only)		x	x	10460-1
Mirror Assembly, Complete	x			14-1025
Mirror Holder Assembly, 1316/2316			x	10524
Mirror Holder Assembly, 3336		x	x	10525
Mounting Block, Runout Gage and Illuminator	x	x	x	10342
Post, Runout Gage and Illuminator	x			10344
Post, Runout Gage and Illuminator, 1316/2316			x	10528
Post, Runout Gage and Illuminator, 3336		x	x	10462
Runout Gage, Complete	x	x	x	14-4000
**Screw, Metal, Thumb	x	x	x	98-901
**Screw, Nylon, Thumb 8/32 x 3/8	x	x	x	NTS
Shaft, Stop	x	x	x	10466-2
Shim, Teflon, Runout Gage Post	x	x	x	14-1037
Signaling Device, Audio, 360 Degrees	x	x	x	10409
Spindle Assembly	x			10767
***Spindle Assembly, 3336—Type Packs		x	x	10791
Switch, Illuminator, ON/OFF Leviton	x	x	x	413W
Tip, Nylon, Runout Gage	x	x	x	14-4001
Transformer, Isolation	x	x	x	14-4002

*Cannot be shipped separately. Return mirror arm for installation of mirror

**Located on runout gage and illuminator mounting block.

***Excludes cone adapter.