

PREVENTIVE }
MAINTENANCE }

ELECTRIC
TEST SCORING MACHINE
Type 805

CONTENTS

	Page
Meter	3
Potentiometers	3
Formula and Master Control Switches	3
Pin Set Unit	4
Sensing Unit	4
Platen Carriage and Toggle Links	5
Motor Drive Unit	5
Motor Key Shaft, Linkage and Shutter	6
Batteries or Electronic Power Pack.	6
Base	7
Tests	7
Answer Sheet Alignment to the Sensing Unit.. . . .	7
GRAPHIC ITEM COUNTER	7
Pawls and Pawl Carrier Frames	8
Carriage	8
Emitter and Emitter Wiper Contacts	9
Control Panel	9
GIC Power Supply Chassis and Relays	9
Tests.	10

PREVENTIVE MAINTENANCE
TEST SCORING MACHINE, TYPE 805

GENERAL

The machine should be kept as free of dust and oil as possible, to avoid high resistance leaks and shorts in the scoring circuits, particularly in areas having a high humidity. Most of the parts and units can be wiped free of dust and oil with a cloth. The use of carbon tetrachloride will be a very useful cleaning agent where oil may have soaked into insulating material, or where oil and dust are very hard to remove to the inaccessibility with a cloth or brush. The use of carbon tetrachloride should be kept to a minimum and used only in well-ventilated areas.

Inspection

- (a) Cleaning
- (b) Meter
- (c) Meter Light Bulbs
- (d) Shutter Signal Bulb
- (e) Potentiometers
- (f) Potentiometer Panel -- fuses and switches
- (g) Switch Panel Switches
- (h) Subframe
- (i) Pin Set Unit for Bent and Sticking Pins
- (j) Resistor Unit
- (k) Sensing Unit for bent sensing contacts and loose paper guides
- (l) Platen, Carriage, and Toggle Links
- (m) Paper Deflector
- (n) Paper Dryer
- (o) Motor Drive Unit
- (p) Motor Key Shaft and Linkage
- (q) Shutter
- (r) Batteries or Electronic Power Pack
- (s) Alignment of Answer Sheet to Sensing Unit

Lubrication

IBM 9

- (1) All linkage at points of movement
- (2) Bearings and Pivots

IBM 12

- (1) Motor Drive Unit Housing

IBM 17

- (1) Paper Deflector Cam
- (2) Clutch Disc
- (3) Yaxley Formula Switches
- (4) Cams of Master Control Switch

AVOID EXCESSIVE LUBRICATION

METER

Inspection

1. Check the meter zero setting which is normally set to read $1/2$.
2. Check to see that the needle and movement is free in its pivots. Do NOT remove the cover for checking. The meter linear test or performance test will indicate a sluggish movement.
3. Inspect the meter glass to see that the seal of the glass or that the glass is not broken so that dirt will not get into the meter movement.
4. Test the meter for linear readings after checking the power supply.

POTENTIOMETERS

Cleaning

The potentiometer coil contact surfaces should be cleaned occasionally with crocus cloth. Excessive cleaning with crocus cloth should be avoided because of the possibility of changing the resistance value of the potentiometer strip. NEVER clean with anything other than crocus cloth. Rotating the potentiometer dial contact arms from one end of the strip to the other several times is very helpful in keeping the contact surface polished.

Inspection

1. Check to see that the terminal screws are tight on the ends of the strips.
2. Check to see that the discs are tight on the mounting shaft.
3. Check to see that the dial is not warped to the point where it is difficult to turn with the potentiometer panel in place.
4. Check tension of contact arm and wiper.

FORMULA AND MASTER CONTROL SWITCHES

Cleaning

The formula switches need not be cleaned and lubricated at each inspection. They should be inspected to see if a metallic streak runs through the lubricant from one contact spot to the next. If it is visible, the switch should be washed out with carbon tetrachloride and some new lubricant should be placed in the switch. Rotate the switch a few times after cleaning to clean off any residue on switch contact areas.

Inspection

1. Check the formula switches for wear on the contact areas.
2. Check the master control switch for proper contact adjustment being sure that no more than one group of contacts is made at one time.

3. Check to see that all the soldered connections are good and that no wires are broken at the connections to the switches.

Lubrication

1. Lubricate the Yaxley formula switch contacts with IBM 17.
2. Lubricate the master control switch contact operating cams and detent cam with a film of IBM 17.
3. Lubricate all other points of movement with IBM 6.

PIN SET UNIT

Cleaning

The pin set unit over a period of time will collect fine dust. The only way to clean it without doing harm is by using air pressure and blowing it out. Some machines never need it. The need for cleaning will depend upon the customer and location of the machine. An easy way to clean or polish the contact areas of pins and contact fingers is to push each of the pins in and out and twirl them at the same time.

Inspection

1. Check to see that all pins are straight and that they do not bind.
2. Examine the unit to see that the contact fingers have sufficient tension to make contact on the pins.
3. All contact caps in the rear of the unit should be free in the guides.
4. Check to see that all the common connections in the front of the unit are in place with the common wires in the hooks of the contact finger strips.

SENSING UNIT

Cleaning

The unit may be cleaned in the machine with the channel brush, or it may be removed and the sensing contacts brushed. The unit should be brushed quite often in order to keep the graphited fibers of paper and lint from collecting and causing high resistance shorts.

Inspection

1. Check to see that no blades are bent or shorted.
2. Check to see that the sensing unit heater element is not open and is not grounded when installed in the machine.
3. See that all the contact caps are free in their guides.
4. Examine to see that the sensing contact paper guards on the sensing contact side of the unit are securely in position so that they will not come out of place and damage the sensing contacts.

PLATEN, CARRIAGE AND TOGGLE LINKS

Cleaning

The platen should NEVER be cleaned of the graphite collected or applied on the surface. The graphite assists in arresting the static charge that has a tendency to collect on the surface of the rubber platen.

The carriage and toggle links should be wiped free of dirt and old lubricant.

Inspection

1. Examine the platen surface to see that it is smooth and that the sensing contacts have not made deep impressions in the surface of the rubber.
2. Make a platen pressure test to see that the platen exerts even pressure over the sensing unit by using carbon paper and an answer sheet as described in the reference manual. At the same time check to see that the platen pressure stud is adjusted for minimum pressure on the answer sheets so that the motor stalls on 3 to 4 sheets in the channel.
3. See that the toggle link studs in the carriage are in place and tight.
4. Check to see that the toggle links are carried $1/32''$ past dead center by the connecting link when the toggle is straightened out.
5. Check to see that the platen comes against the sensing unit squarely, and at the same time the paper deflector functions properly.

Lubrication

1. Lubricate the toggle links and studs, carriage rollers and studs with IBM 9.
2. Lubricate the carriage rails with IBM 17.

MOTOR DRIVE UNIT

Cleaning

The motor drive unit should be wiped free of all excessive lubrication and dirt. Particular attention should be paid to the area around the commutator and brushes. Carbon dust from the brushes and oil will cause high resistance grounds and will occasionally carbonize the brush holder. Carbon tetrachloride has been found very satisfactory in cleaning brush holders and commutators. Do NOT soak the porous bronze bearing in the bearing bracket with cleaning fluid, as this may destroy some of its characteristics.

Inspection

1. Check the armature for wear and end play. Examine the thrust bearing.
2. Check the adjustments of the unit.
3. See that all studs are tight.
4. Check brushes for wear and replace if necessary. It is better to replace a brush than to use an old brush that will allow the brush spring to wear into the commutator before the next inspection. Be sure that the motor brushes are free in their holders.
5. Check for proper oil level.
6. Check to see that unit is free of grounds.

Lubrication

1. Use IBM 12 in the drive housing. Fill housing up to the oil level screw.
2. Use IBM 17 on the perimeter of clutch disc.
3. Use IBM 9 on the outer support bearing and all other moving parts.

MOTOR KEY SHAFT, LINKAGE AND SHUTTER

Inspection

1. See that the motor key shaft and linkage does not bind.
2. Check to see that motor drive trip pawl and motor key shaft is properly adjusted. Check the trip pawl cam adjustment.
3. Check to see that the shutter slide does not bind.
4. Check shutter latch arm to see that the latch arms drop down behind the shutter latch block approximately .010" with platen against the sensing unit. Check to see that the shutter releases on both sides at the same time and that the latch arms are held above the latch block by 3/32" with motor key in normal position. Be sure all arms are tight on the motor key shaft.

Lubrication

Lubricate all pivot points and points of movement with IBM 9.

BATTERIES OR ELECTRONIC POWER PACK

Inspection

Batteries

1. Test each "B" battery using the test circuit on the machine to see that the potential of a battery does not drop more than 3 volts when the test load is placed across it. Batteries should be tested at least once every 3 months.

2. Replace the $1\frac{1}{2}$ volt cells whenever the over-100 circuit fails to function properly, or when the zinc case begins to show outside deterioration when the paper case is removed.
3. Place the "A" or $1\frac{1}{2}$ volt cells on a pane of glass to insulate the case from the base of the machine if the paper case should be impregnated with moisture.

Power Pack

1. Test the power pack output by placing a 200 mark load on it as described in the reference manual. The voltage drop should not be more than 3 volts, using a voltmeter of 20,000 ohms per volt sensitivity across the terminals of the power pack. The tubes should be tested if this condition arises. It is possible that other components may be defective.
2. Check the unit for proper output voltages and adjust if necessary.

BASE

It is important that the machine appearance be kept up to a high degree of perfection. Use the polish supplied to the local branch office to keep the covers clean. Check the trim mouldings to see that they are not broken or bent. Replace if necessary. Replace or refinish the covers that have a badly worn finish or marred to the point that the appearance is poor.

ANSWER SHEET ALIGNMENT TO THE SENSING UNIT

The answer sheet should be positioned in relation to the sensing contacts so that the answer spaces on the answer sheets center on the sensing contacts. Use a sheet of soft carbon against an answer sheet to check alignment. This is referred to a Paper Channel and Paper Shutter adjustments. These adjustments are important and should be made carefully.

TESTS

The machine should be tested thoroughly after an inspection. The tests under the heading of Performance Tests in the 805 section of the Reference Manual should be used to test the scoring of the machine.

GRAPHIC ITEM COUNTER

Cleaning

The counter should be kept as free of dirt as possible. Since it has more lubrication about it than the rest of the machine, dust and dirt has more of a tendency to cling to it. It should be wiped clean at each inspection. It may be necessary to moisten a cloth with cleaning fluid occasionally to clean the dried oil off the unit. Always wipe out the oil pan under the unit at the time of each inspection.

Inspection

- (a) Cleaning
- (b) Pawls and Pawl Carrier Frames
- (c) Carriage
- (d) Emitter and Emitter Wiper Contacts
- (e) Platen
- (f) Motor and Governor
- (g) Counter Discs and Brake
- (h) Control Panel and Emitter Contact Wires
- (i) GIC: Electronic Power Supply Chassis and Relays

Lubrication

1. Spray the counter disc pawls and combs lightly with IBM 6.
2. Use IBM 9 on all points of movement of links, pivots, bearings, carriage slides and oil wells in the carriage frame slide bearings, feed screw shaft, and carriage clutch.
3. Lubricate the platen support arm camming studs, gears, reset interlock operating slides, emitter contact wipers and slide contacts with a thin film of IBM 17.

PAWLS AND PAWL CARRIER FRAMES

Cleaning

Pawls and their guide combs must be free of all dirt and gum for the best performance. When the pawl and frames become gummed with oil and dirt, it is advisable to remove the frame assemblies from the counter and wash them in a cleaning fluid.

Inspection

1. Check to see that all pawls are free in their guide combs, and that none of the pawls are bent.
2. Check to see that the frames are straight, and the pawls are in line.
3. Check the adjustments of the pawls and frames. These adjustments are important. Refer to the Reference Manual, 807 section, Pawl Carrier Frames for adjustments.

Lubrication

The pawls and guide combs should be sprayed lightly with IBM 6.

CARRIAGE

Inspection

1. Check for wear in the guide bearings. If the carriage is too loose, failures may occur due to the magnet and emitter contact wipers relationship shifting as the carriage moves from one side of the unit to the other.

Replace the guide bearings in the carriage if they show much wear.

2. Check the emitter contact wipers and the rail wipers for wear and tension.
3. Check the counter magnet clearance to the pawls.

Lubrication

1. Use a film of IBM 17 on the emitter contact wipers and rail wipers.
2. Use IBM 9 in carriage guide bearing oil wells. About 3 drops of oil is sufficient on each application. Use 9 on the clutch and feed screw nut.

EMITTER AND EMITTER WIPER CONTACTS

Inspection

1. Check the emitter contact wires and pins to see that none are bent.
2. Check to see that the emitter is positioned parallel to the travel of the carriage by observing the use of the emitter contact wiper off its support. It should be the same all the way across the unit.
3. Check to see that the contact wipers are centered on the contact pin as the magnets are directly over their respective pawls. Also check for wear.

Lubrication

1. Use a very thin film of IBM 17 on the contact wiper rails.

CONTROL PANEL

Inspection

1. Check to see that all contact plugs are in the control panel and that they are tight.
2. Check to see that the control panel pushes the item pins in far enough that all pins are insulated from the rights contact fingers when the panel is in operating position.
3. See that the panel jacks line up with the item pins and the emitter contact wires.

GIC POWER SUPPLY CHASSIS AND RELAYS

Cleaning

1. Due to the location of the power supply chassis, it collects the oil drippings from the motor. The chassis should be wiped off on each inspection to prevent oil soaking of the components mounted on the chassis.

Inspection

1. Check the operation of the time delay unit as to the time it takes the unit to operate.
2. Check relays and adjustments. Refer to Preventive Maintenance Reference Manual, General Section, "Duo Relays."

TESTS

Test the unit thoroughly after an inspection according to the instructions under the heading "Performance Tests" in the 807 section of the Reference Manual.