

The Drucker Company

Reliability in Laboratory Centrifuges Since 1932

6610-01-316-5084



Model 708T

**OPERATION AND
SERVICE MANUAL**



II-1-8

Introduction - - -

Centrifuges are an essential part of the laboratory process and **The Drucker Company** has been *manufacturing centrifuges since 1932.*

The company was formed in St. Louis, Missouri, when Ken Drucker purchased the Phillips Company, an instrument repair company established in 1908. Within a few years, Mr. Drucker had turned the firm's business into that of a manufacturer of centrifuges. A man of foresight, Drucker began experimenting with instruments far in advance of his day, and in time became a respected figure in his industry. His concepts and ideas were so advanced that they are being used today in centrifuge design and operation.

We at **The Drucker Company** are proud of this long history of centrifuge manufacture. Today, as then, centrifuges continue to be the main stay of the Company's business.

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1.0 DESCRIPTION

1.1 Intended Use

The Model 708T is a high-performance, medium-capacity, table-top centrifuge designed for use in the lab or physician's office to perform separation of suspended media by centrifugal force.

1.2 Features

This multi-purpose centrifuge is capable of processing up to 500 ml (using the 1910 rotor) utilizing a variety of tube sizes from 1.5 to 50 ml in specialized or multi-purpose rotors.

Additional features of the Model 708T centrifuge include the following:

- * Fully variable, timed operation from 1.0 to 30 minutes in 1-minute increments
- * Variable speed selections from 100 to 12,000 RPM in 100-RPM increments
- * Dynamic electric braking
- * Accommodates several fixed-angle and horizontal rotors with a variety of accessories
- * Optional 120/240 VAC, 50/60 Hz capability.

Maximum speed of the centrifuge with the fixed-angle 2424 rotor is 10,500 RPM. At this speed and with this rotor, the instrument produces a cumulative RCF of 10,965 x G. Maximum capacity is achieved with the 1910, 10-place rotor. This rotor, with a variety of inserts, will spin from (50) 3-ml to (10) 50-ml tubes.

For details of the rotor, carrier and shield combinations that can be used with this centrifuge, refer to Table 1.1.

1.3 Construction (see Figure 1)

The Model 708T has a steel guard bowl (0.075 in. thick); an optional aluminum guard bowl (0.075 in. thick) is available. The guard bowl is enclosed on the top by a steel lid. An optional Lexan* lid is available which allows for safe observation of the samples. Both lids have a center hole for cooling of the samples and for strobing of the rotor RPM. The lid is secured with a metal latch.

The base of the centrifuge is covered by a steel plate with louvers provided for sample cooling. The unit is supported by four (4) rubber feet. The inside of the guard bowl (rotor chamber) is protected by three (3) coats of Polane enamel paint on a primed surface.

Attached to and protruding into the bottom center of the guard bowl is the motor drive shaft. Motor bearings are the shielded, anti-friction type that never need lubrication. A power supply receptacle and a fuse holder containing two 6.25 slow blow fuses are located on the rear of the centrifuge. For the optional 240 VAC model, there is a voltage selection switch for 120/240 VAC operation.

Note: The proper electrical line cord must be properly plugged into the power supply receptacle. The Model 708T operates on 50 or 60 Hz line frequency.

1.4 Relative Centrifugal Force (RCF)

Cumulative RCF is calculated and displayed using the speed and time values set by the operator and an assumed sample radius of 4.0 in. (25.40 cm).

The cumulative RCF stated in these instructions is an approximate value that is subject to variations due to acceleration and braking times, and overall run time. During acceleration and braking periods, the speed of the centrifuge is less than the speed value set by the operator. The cumulative RCF value is affected most by short run times and heavier rotors, since they take longer to accelerate and brake.

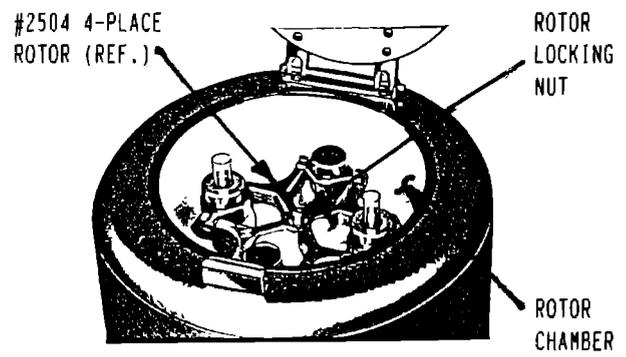
Accurate RCF for any rotor size may be calculated from one of the following formulas.

$$\begin{array}{ll} R = \text{Radius (in inches):} & RCF = 0.000284 (R) (RPM)^2 \\ R = \text{Radius (in cm):} & RCF = 0.0001118 (R) (RPM)^2 \end{array}$$

*Lexan is a trademark of the General Electric Co.



MODEL 708T
FRONT VIEW



TOP VIEW
WITH
LID OPEN

FIGURE #1

1.5 Accessory Combinations

The maximum allowable speed of the Model 708T centrifuge depends on the rotor and accessory combinations used. Table 1.1 lists the most commonly used rotor, carrier and shield combinations, and the corresponding capacity, maximum speed (RPM) and relative centrifugal force (RCF) obtained.

1.5.1 Supplied Equipment

The following items are supplied with each centrifuge:

1. A Model 708T centrifuge.
2. One (1) rotor of the customer's selection at the time of purchase.
3. For horizontal rotors, the correct number of trunnion rings, test tube shields and tube cushions as specified on the purchase order.
4. For angular rotors, the correct number of test tube shields and tube cushions as specified on the purchase order.
5. One (1) line cord.
6. Two (2) fuses.
7. One (1) operator's manual.

1.5.2 Equipment Not Supplied

Sample containers of any type are not supplied with the centrifuge.

Table 1.1 Most Commonly Selected Rotor, Carrier and Shield Combinations for the Model 708T Centrifuge

FIXED-ANGLE ROTOR:						
Rotor No.	Places and Tube Type	Shield No.	Max. Cap. (ml)	Max. RPM	Radius (in.)	Max. RCF (x G)
1224	24; 5-15 ml	8103 8107	360	5,000	2.25	9,200
1708	8; 5-15 ml	8103 8107	90	5,500	3.50	3,000
1824	24; microtubes	N/A	72	10,000	4.50	12,800
1812	12; 5-15 ml	8103 8107	120	5,200	4.50	3,450
1844*	4+4; 15-50 ml	8114 8103	(4) x 50 ml (4) x 50 ml	5,000	4.50	3,200
1910	10; 50 ml	8114	500	4,500	6.0	3,450

HORIZONTAL ROTOR:								
Rotor No.	Places and Tube	Shield Type	Carrier	Trun. Ring No.	Max. Cap. (ml)	Max. RPM	Radius (in.)	Max. RCF (x G)
2424	24; 0.5 ml	N/A	N/A	N/A	12	10,500	3.50	10,965
2504	4; general purpose	N/A	8114	5121	200	4,000	4.90	2,728
		8103	N/A	5128	120	3,200	6.25	1,891
2506	6; general purpose	8103	N/A	5128	180	3,200	6.25	1,608

*The 1844 rotor will spin a combination of four carriers plus four tube shields (opposites must be identical). For example, the rotor will accommodate four 4175 carriers with five tubes each for (20) 5-ml tubes plus four 8103 tube shields for (4) 15-ml tubes.

2.0 SPECIFICATIONS

General specifications of the Model 708T centrifuge are listed below.

Maximum Speed with 2424 Rotor	10,500 RPM
Maximum Capacity with 1910 Rotor	500 ml
Centrifuge Motor	1/3 HP (approx.) single phase
Guard Bowl, inside diameter	13.75 in. (34.92 cm)
Protection Fuses (2)	6.25 slow blow
Timer	1 to 30 min. (1.0-min. increments)
Speed Range (rheostat speed control)	100 to 12,000 RPM (100-RPM increments)
Overall Dimensions	
Height with Cover Closed	13.0 in. (33.0 cm)
Height with Cover Open	23.0 in. (58.4 cm)
Width	15.0 in. (38.1 cm)
Depth	15.0 in. (38.1 cm)
Power Requirements	
Nominal	120 VAC/60 Hz
Optional	120/240 VAC, 50/60 Hz
Weight*	
Steel	30 lbs (13.5 kg)
Aluminum	25.4 lbs (11.4 kg)

*Total machine weight with 2504 4-place rotor, four (4) 5128 trunnion rings and eight (8) 8103 test tube shields.

3.0 WARRANTY INFORMATION

The Drucker Company warrants that it will repair or replace, free of charge to an authorized dealer of Drucker, any centrifuge that fails after delivery to the original customer because of defective material or workmanship (provided it does not fail under the exceptions and conditions specified in the warranty given with the instrument), but within the following time periods:

- a. One (1) year overall warranty on the centrifuge,
- b. Sixty (60) day warranty on all replacement parts (except drive motor) and all failed/serviced parts must be returned to the factory before full warranty allowance or credit will be given.

Such exceptions and conditions include, but are not limited to, failure of parts due to natural wear, accident, neglect or operation in a manner not prescribed in the Installation and Operation Manual or Service Manual supplied with the centrifuge. The foregoing expresses the Drucker Company's sole warranty with respect to the centrifuge. This warranty is made in lieu of any and all other warranties and all implied warranties of merchantability and fitness for a particular purpose are hereby disclaimed or excluded. The Drucker Company and its authorized dealers will not be liable for consequential damages, losses or expenses arising from the improper use of the centrifuge. The Drucker Company will not honor any other warranty given by the authorized dealer that is different from the warranty given by the Drucker Company. This warranty is not assignable and is operative only in favor of the original customer to whom this warranty is delivered.

3.1 Dealer Obligation Under Warranty

Customers requesting service for an instrument during the period covered by the warranty should receive a response within a 48-hour period from the authorized dealer who sold the instrument. If this obligation is not met and the customer so advises the Drucker Company, such authorized dealer will be notified of and responsible for the action taken and expenses incurred by the Drucker Company in satisfying the customer.

3.2 Disclaimers and Exclusions

The Installation and Operation Manual or Service Manual supplied with this instrument includes a troubleshooting section. However, the customer is under no obligation to locate or remedy any service problem. The customer hereby releases and forever discharges the Drucker Company, its successors, assigns, subsidiaries, affiliates, officers, agents, and employees from any and all claims, demands and liabilities in law or in equity, of any nature, based upon, arising out of, or resulting from locating, remedying or attempting to locate or remedy any service problem. If service is required, the customer should contact the dealer from whom the instrument was purchased to obtain service by factory-trained personnel.

The information included in this Installation and Operation Manual or Service Manual is believed adequate for the operation and intended use of this centrifuge. If the centrifuge is to be used for any purpose exceeding or deviating from the capabilities specified herein, then written confirmation of acceptability for such purpose should be obtained from the Drucker Company. Failure to do so may affect the warranty. The Drucker Company will not guarantee any results nor assume any obligation or liability arising from such action.

To obtain service and/or replacement parts under warranty, the customer should contact the Drucker Company dealer from whom the instrument was purchased, or write directly to:

The Drucker Company
4507 NW 130rd Avenue
Sunrise, Florida 33351
(305) 746-8866

Your correspondence must include the model and serial numbers of the instrument, the date of its delivery, and the name of the dealer from whom the instrument was purchased. The Drucker Company can not accept goods returned without proper authorization. A "Returned Goods Authorization" must be obtained through a dealer or the factory, and must accompany the prepaid return shipment.

To obtain service and/or replacement parts not under warranty, or to order additional accessories, the customer should contact the factory or any authorized dealer.

Note: In the event the customer wishes to return the instrument or any part thereof, the customer must comply with the following requirements:

- a. Decontaminate the instrument or any part that has been exposed or used to process potential pathogenic or radioactive material. Decontamination must be performed to ensure no radioactivity or harmful bacteria is present and the customer must advise the Drucker Company accordingly.
- b. Decontaminate the instrument or any part that may have accumulated blood or any other chemical deposits by using standard laboratory procedures. If this instrument or any part is received in a condition the Drucker Company considers to be a potential biological hazard to its personnel, the instrument will be returned to the customer unrepaired, at the customer's expense, along with a report of the Company's findings.

3.3 Registration of the Instrument

For registration purposes, the customer must fill out the Warranty Registration/Installation form supplied with the instrument and must return the completed form to the Drucker Company. Since return of the Warranty Registration/Installation form is the customer's assurance and verification that the centrifuge is properly located and installed at the customer's facility, failure to complete and return the form may void the warranty.

4.0 INSTALLATION

4.1 External Packaging and Inspection

Before signing the delivery receipt and accepting the instrument, inspect the shipping carton for any obvious signs of mishandling, such as broken or dented sides. Damage to the carton must be noted and a written statement indicating the nature of the damage must be made upon signing the delivery receipt. A normal or undamaged carton does not necessarily ensure that the centrifuge has not incurred damage during shipment. If mishandling is suspected, contact the office of the carrier, so a representative may witness unpacking. Carefully examine the centrifuge and document any damage that can be attributed to mishandling. A signed inspection report should be furnished by the shipping company. The Drucker Company is not responsible for transit damage.

4.2 Setup Procedure

- 1. Unpack the centrifuge and inspect for obvious damage.**
- 2. Place the centrifuge on a hard, stable surface.**

Caution: Failure to provide adequate space for ventilation and operation can cause overheating and premature failure.

Note: A clearance height of 24 inches is required to open the centrifuge lid.

- 3. Open the lid by rotating the latch knob and lifting up the lid.**
- 4. Remove the rotor stabilizer (if included) and any protective shipping material from the guard bowl. Remove any shields, carriers or other accessories that may have been shipped inside the guard bowl.**
- 5. Verify that the type and quantity of accessories shipped with the centrifuge matches the list on the shipping papers.**

6. Slowly rotate the rotor by hand; check for level rotation. If the rotor turns freely and evenly, continue with the following steps. If not, check for a bent drive shaft (see Table 6.1).

Caution: If the rotor wobbles or shows signs of uneven rotation, do not proceed. Contact your authorized dealer or the Drucker Company.

7. Verify that the timer is at 0 time and that the speed control is set to 0 RPM ("OFF" position).
8. Verify that the line voltage at the outlet is 120 ± 5 VAC or 240 ± 5 VAC, depending on the voltage of the model purchased.
9. Connect the line cord to the power receptacle on the back of the centrifuge and plug the other end of the line cord into the outlet.
10. The Model 70BT has been factory calibrated for all electrical/electronic and mechanical adjustments. If the unit passes steps 1-9 of this section, proceed to section 5.0 "OPERATION".

5.0 OPERATION

It is important to read the following procedures thoroughly before attempting to operate the Model 708T centrifuge.

5.1 Installing the Rotor

If the rotor has not been installed in the centrifuge, perform the following steps:

1. Select the desired rotor and accessories. Verify that the rotor and accessories match.
2. Open the lid by rotating the latch knob and lifting up the lid.
3. Turn the rotor thumbscrew (see Figure 1) counterclockwise and remove it from the shaft.
4. Slide the rotor down over the drive shaft, positioning the rotor drive slot onto the flats of the drive shaft (Figure 2).

Caution: To prevent damage to the centrifuge, the rotor must be properly positioned on the drive shaft.

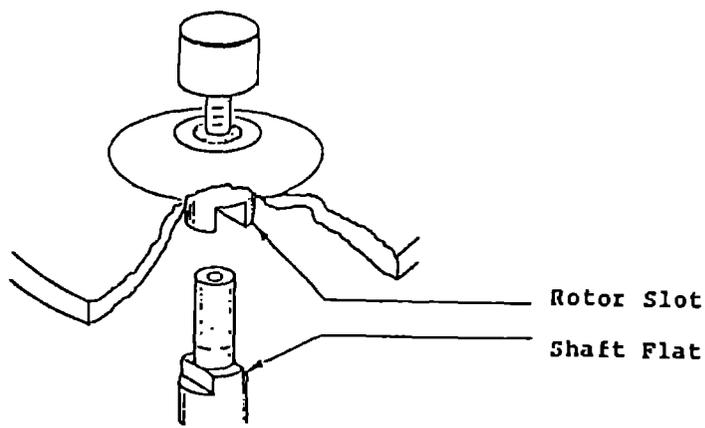


Figure 2. Rotor/Shaft Interface

5. Compare the rotor drive slot with the drive shaft flat and verify that they are aligned in the same direction.
6. Fasten the rotor in place by turning the thumbscrew clockwise until it is tight.

Note: If the rotor is mounted correctly, the thumbscrew should require about six full turns to tighten. If only three or less turns are required, loosen the thumbscrew and repeat steps 4-6.

5.2 Installing the Accessories

Do not install the accessories provided with the centrifuge until the checkout procedures in section 5.4 have been successfully completed.

5.3 Proper Balancing

If constant vibration is noticed in normal laboratory use, the cause may be due to an unbalanced load in the rotor. To attain a balanced load, adhere to the following rules:

1. Load the rotor symmetrically and with a full complement of accessories.
2. Use tube shields, trunnion rings, and/or carriers that are all within 0.5 grams of each other without a load.
3. Verify that each shield has the proper cushion and all shields contain only one cushion.
4. Use only Drucker rotors and accessories with this centrifuge.
5. To prevent unequal stresses on the rotor, load all horizontal and fixed-angle rotors with a full complement of accessories.
6. To obtain a good dynamic balance, the opposite loads must be equal in mass and have the same center of gravity. Therefore, select tubes and bottles (in pairs) that are alike in shape, thickness and distribution of glass or plastic. The larger the container, the more critical the selection.
7. Use a laboratory balance with a sufficient capacity to handle the size of the container. The laboratory balance should have a sensitivity of one-tenth of a gram at full load.

8. Use the following balancing technique to obtain the best possible weight distribution as well as to provide maximum external support for the glassware/plasticware:
 - a. If test tubes are used, ensure that each tube has the same volume and density of liquid.
 - b. If test tubes are not used or cannot be visually observed, place opposite, loaded carriers or shields on a laboratory balance capable of reading to 0.1 grams minimum.
 - c. To the lighter carrier or shield, add a non-abrasive material, such as rubber discs, until the two carriers or shields are of equal weight.

Note: All centrifuges have critical speeds at which vibration occurs. As the speed increases beyond the critical speed, vibration will diminish. This inherent condition also occurs during deceleration. An unbalanced load intensifies the effect of these critical speeds.
 - d. Leaving the added weights (i.e., rubber discs) in the shields or carriers, place the shields or carriers directly opposite each other in the rotor.
 - e. Repeat steps a-d for the next two shields or carriers, and subsequent shields or carriers, until all are installed.
9. Verify that each carrier or shield is rotating freely in the rotor.

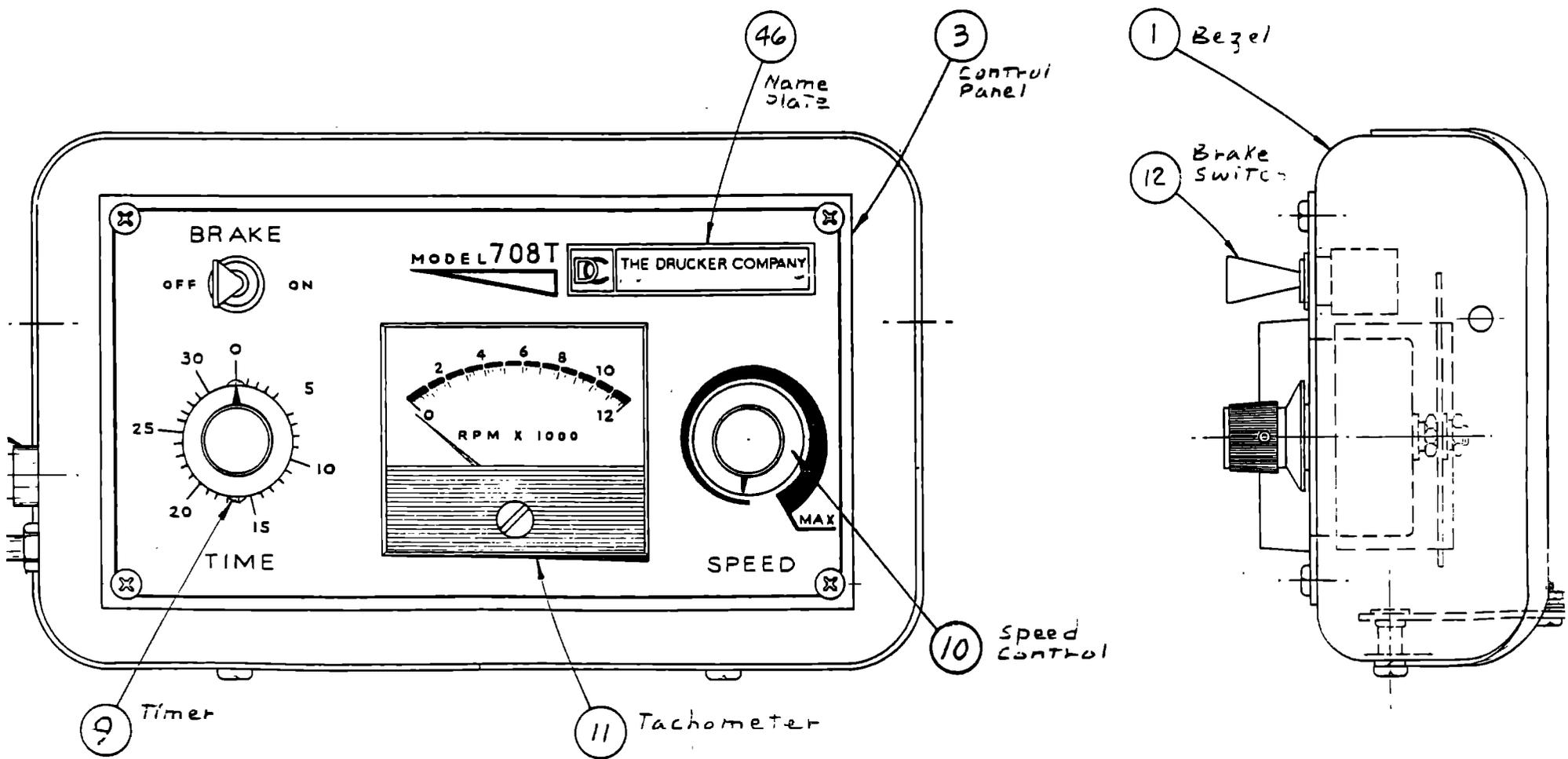
5.4 Checkout Procedure (see Figure 3)

Note: If the rotor has not been installed, follow the steps in section 5.1.

Note: Do not install the shields or carriers or any other accessories at this time.

1. Plug the power cord into the correctly rated receptacle.
2. Ensure that the lid is closed and latched.
3. Set the time for five (5) minutes by rotating the time selector knob.

4. Rotate the rheostat speed control knob clockwise approximately 1/4 turn (arrow at 9 o'clock).
5. Observe the display. The needle will indicate the actual rotor speed (RPM).
6. Adjust the speed control until the speed indicator reads 2000 RPM.
7. Listen to the sound of the centrifuge; a smooth whirring sound should be heard. If there are any unusual scraping or knocking sounds, stop the centrifuge immediately and check for loose objects in the rotor chamber.
8. Allow the run time to expire. The rotor will stop when the time reaches zero.
9. When the rotor has stopped, place empty shields and trunnion rings or carriers in the rotor and rotate the speed control knob to obtain 2000 RPM. Repeat steps 2-6.
10. If the selected speed is not obtained, or if excessive vibration is observed beyond that discussed in the note in section 5.3, step 8c, refer to "Troubleshooting", section 6.4. If the unit successfully passes steps 1-9 of this section, the unit is ready for operation.



Control Panel

Figure # 3

6.0 SERVICE

This section contains instructions for servicing the Drucker Model 708T centrifuge. Diagnosis and servicing of machine problems must be carried out by a qualified service technician. Attempted service by anyone other than a qualified service technician will void any Drucker warranty.

6.1 Drucker Service Philosophy

All Drucker centrifuges are designed for maximum serviceability. A Model 708T may be completely repaired (i.e., replacement of all the main serviceable parts in approximately one hour). For example, the main control panel, which contains all the input/output regulating devices to drive the Model 708T, is harness connected to the motor and is replaceable in approximately 15 minutes.

6.2 Power Input and Protection

The required AC power supply is either 120 or 240 V, depending on the voltage selected. The centrifuge is protected by two (2) 6.25 slow blow fuses.

6.3 Service Examination

In order to service the Model 708T centrifuge, it may be necessary to open the unit for access to the mechanics and electronics located within the cabinet. Refer to section 6.5.1 for access to the electronics, motor, and mechanics.

6.4 Troubleshooting

Before attempting service on the Model 708T, refer to Table 6.1 (on the following page) for the most probable cause of malfunction.

Table 6.1 Troubleshooting

Symptom	Possible Cause	Suggested Solution
1. No operation when ON/OFF switch is on.	No voltage reaching the centrifuge.	Check outlet and line cord connection at rear of centrifuge.
	Blown fuse.	Replace fuse. If fuse blows again, check for loose wires or shorting.
2. No motor voltage when ON/OFF switch is on.	Brush not contacting motor commutator.	Clean brush holders and check brush fit. Replace brushes if badly worn. Check continuity of armature and fields.
	Open circuit to motor.	Check for loose connections from control panel to circuit board and from circuit board to the motor.
3a. Centrifuge does not reach speed.	Low line voltage.	Verify that voltage is at least 110 VAC for the 120 VAC model, or 200 VAC for the 240 VAC model.
	Improper speed selection.	Refer to Table 1.1 for maximum RPM of the selected rotor.
3b. Speed display varies by more than 5% from actual speed.	Damaged speed indicator.	Replace speed indicator.
	Missing or broken teeth on chopper wheel.	Replace chopper wheel.

Table 6.1 (continued)

Symptom	Possible Cause	Suggested Solution
4. No tach reading at any speed.	Loose tach hub on motor shaft.	Align and tighten tach hub between the optical sensor.
	Tach plug disconnected.	Attach plug or check for loose pins.
	No tach input on E5.	Check 5 VDC regulator. If okay, check A1. Replace A1 if necessary.
	No input to U1.	Check output of T1 for 6.3 VAC.
	Open tach.	Check input to tach and replace tach assembly if defective.
5. Fuse blows when line cord is plugged in.	Defective ON/OFF switch.	Replace ON/OFF switch.
	Short circuit in electrical connection.	Troubleshoot electrical circuit and replace defective component.
6. Fuse blows when motor is accelerating to set speed.	Improper fuse rating (less than 6.26).	Insert properly rated fuses.
	Defective motor.	Replace motor assembly.

Table 6.1 (continued)

Symptom	Possible Cause	Suggested Solution
7. Unit will not brake.	Brake switch not on.	Turn on brake switch.
	Brake switch open.	Replace switch.
	Brake relay contact stuck in lower position.	Replace relay.
8. Unit rotates at zero RPM.	Speed control module misadjusted.	Adjust low speed adjustment so unit will just rotate at approx. 100 RPM.
9. Motor rotates sluggishly.	Defective motor.	Replace motor.
	Defective tach sensor.	Replace tach sensor.
10. Test tubes break during run.	Improper installation of test tubes.	Place tubes correctly in centrifuge. Verify that all tube cushions are flat and in the tube shield.
	Dirty test tube shields.	Remove and clean all test tube shields.
	Foreign material in test tube cushions.	Remove and inspect all test tube cushions. If required, clean and remove any glass or foreign particles.

Table 6.1 (continued)

Symptom	Possible Cause	Suggested Solution
12. Excessive vibration.	Improper speed selection.	Refer to Table 1.1 for maximum RPM with the selected rotor.
	Out-of-balance samples.	Recheck samples. Balance two shields or carriers at one time placing shields or carriers opposite each other in the rotor.
	Out-of-balance accessories.	Remove all samples from the shields or carriers. Spin centrifuge at 2500 RPM. If vibration persists, remove shields or carriers and spin again. If vibration has stopped, check shields or carriers for damage or accumulated deposits. If the carrier or shield is damaged, replace. If vibration persists after shields or carriers have been removed, check rotor for damage or deposits. If none are found, refer to "bent drive shaft" below.
	Bent drive shaft.	Remove all shields or carriers from rotor. Slowly rotate rotor by hand. If rotor wobbles from side-to-side or up and down, the drive shaft is bent. Do not operate the centrifuge. Replace the motor.

6.5 Field-Serviceable Areas

The following four (4) main areas of the Model 708T centrifuge are field serviceable:

1. Instrument Panel (7767055): Located at the front of the instrument.
2. Motor Assembly (7767053): Located inside the cabinet attached to the rotor chamber motor housing.
3. Speed Sensor Assembly (7767010): Attached to the base of the motor.
4. Miscellaneous Power Components: Located inside the centrifuge cabinet.

6.5.1 Assembly, Instrument Panel (7767055)

Note: All 7-digit numbers are part numbers of the Drucker Company. The 1- and 2-digit numbers correspond to the item numbers on the listed drawing and the list of materials.

The instrument panel holds all operating controls for the unit, plus all power supply components. The bezel (1) contains the following components:

(9) Timer (7722003): Variable from 0-30 minutes. It is also the main power switch for the unit (when off, no power is applied). The timer is electrical.

(10) Speed Control Module (7722004): Controls the voltage applied to the motor using a triac. There is a low speed adjust for setting the initial starting speed. The rotor should barely turn when the timer is engaged.

(11) Tachometer (7729005): Linear from 0-12,000 RPM. The tachometer P.C. board (7767056) (4) mounts on its back. This board receives triggers from the tachometer sensor assembly (7767054), and changes them into usable pulses that vary proportionally in frequency with the speed of the motor.

(12) Brake Switch (7751045): In the "OFF" position, the unit will coast to a stop. With the switch in the "ON" position, a short is placed across the motor armature, causing the unit to brake to a stop. The faster the unit is rotating, the greater the reverse electro-motive force (EMF) applied across the motor armature when the brake mode is activated, and the faster the unit will stop rotating.

(13) Brake Relay (7745010): Feeds voltage across the motor armature to brake the unit. However, two conditions must be met. (i) The unit must be rotating and the power must be taken away from the unit, and (ii) the brake switch must be in the "ON" position.

(14) Transformer (7756006): Supplies power to the tachometer P.C. board.

(16) R/C Network (7727001): Suppresses AC line spikes.

Note: Also connected to the mounting plate are two cables which connect the panel to the motor assembly (7767053) and the tachometer sensor assembly (7767010). The motor connector is a 6-pin connector, while the tachometer sensor is a 4-pin.

6.5.2 Disassembly, Instrument Panel (7767055)

There are four screws and two connectors that must be removed to allow complete removal of the panel. Two screws are located on the bottom of the bezel (1), and the other two screws are on the sides of the bezel.

Once these screws are removed, the assembly can be pulled clear of the shell. The two connectors for the tach sensor and the motor assembly are now visible and disconnecting them frees the assembly from the unit.

6.5.3 Motor Assembly (7767053)

6.5.3.1 Description

The height of the motor is controlled by how much the locknut (7728153) (27) is up or down on the screw (2808075) (21). The higher the nuts are screwed up, the higher the motor shaft will stick out of the motor well and through the rubber grommet (7714060) (11). Placement of these nuts are critical because rotors such as the 934 must have clearance from the rubber shield or they will rub and not rotate.

The motor also has a tachometer sensor assembly attached to the lower end bell and a tachometer rotor attached to the lower armature shaft. A 6-pin male connector extends from the motor shell, while a 4-pin connector extends from the tachometer sensor assembly.

6.5.3.2 Disassembly or Removal

To remove the motor, perform the following steps:

1. Disconnect all power to the centrifuge.
2. From inside the rotor chamber, disconnect the rubber boot holding the motor drive shaft to the edge of the sheet metal motor housing.
3. Lay the centrifuge on its side and remove the screws holding the removable ventilation plate on the bottom of the centrifuge. Remove the bottom ventilation plate.
4. Unplug the motor (two plugs) and lift it free of the unit (7767052), (P1) and (P2).

To remove the armature, perform steps 1-4 above and then the following steps:

1. Remove the tachometer cover (7712237) (33) and hardware (28) and (29). (See also 7767053.)
2. Remove the tachometer sensor assembly and hardware (34) and (36). (See also 7767053.)
3. Remove the tachometer hub (7768129) (32). (See also 7767053.) An allen head set screw holds it in place.
4. Remove the motor mount plate and hardware (see 7767053).
5. Remove the brush caps (7735022) (11) and brushes (7735023) (13). (See also 7767053.) Note the face of the brushes as you remove them. They must be replaced in the same position.
6. Turn the motor so that the tie rods (7712236) (5) are pointing down. Tap the tie rods on a smooth, hard surface. The upper end bell (7712143) (2) with the attached tie rods should break free from the motor shell (7770066) for easy removal.
7. Remove and replace the armature.

6.5.3.3 Replacing the Motor Brushes

If the centrifuge is used on a daily basis, the brushes may require replacement every 6 months; however, this time will vary depending upon the amount of use.

1. Disconnect all power to the centrifuge.
2. From inside the rotor chamber, disconnect the rubber boot holding the motor drive shaft to the edge of the sheet metal motor housing.
3. Lay the centrifuge on its side and remove the screws holding the removable ventilation plate on the bottom of the centrifuge. Remove the bottom ventilation plate.
4. Remove the motor assembly, unplug the 6-pin power connector and the 4-pin tachometer connector.
5. Remove the brush holder caps (7735022) (11).
6. Remove the brushes (7735023) (13) and replace with new brushes.

6.5.3.4 Other Motor Data

Brush phasing is an important part of the total operation of the motor assembly. Drawings 7767052 and 7767053 show the brush holder in the center of the motor shell cut out. This is not technically correct and is shown for illustrative purposes only. The best wattage and speed characteristics are obtained when the brush holder is all the way to the right side of the cut out, with the armature shaft pointing up as shown in 7767052.

6.5.4 Speed Sensor Assembly (7767010)

6.5.4.1 Tachometer P.C. Board (7767056)

The speed sensor assembly (see also 7763041) is mounted on the lower end bell of the motor. The tachometer hub is mounted on the armature shaft and is aligned between the cut out of the optical sensor (A1). The 6.3 VAC is converted to DC by U1. The unregulated DC is then sent to VR3, a 5 VDC regulator. VR3 also furnishes 5 VDC to the tachometer P.C. board.

When the hub interrupts the photoelectric cell signal sent through A1 (a photo diode/transistor combination), a trigger is formed. This trigger is sent to a 555 timer I.C., which sends the triggers out as pulses to the tachometer. It should be noted that the pulses vary in frequency, not amplitude or pulse width. The greater the number of pulses (frequency), the higher the reading on the tachometer. R5 on the tachometer P.C. board is used to calibrate the RPM.

6.5.5 Miscellaneous Power Components

Refer to section 6.5.1, Assembly, Instrument Panel (7767055), for the diagnosis and replacement of the individual power components.

7.0 MAINTENANCE

7.1 Care and Cleaning of Rotors and Accessories

The following preventative maintenance procedures are to ensure consistent operation of this device; however, these procedures should be performed by qualified personnel with a basic understanding of electro-mechanical devices.

7.1.1 Corrosion Prevention

For proper operation and safety, the operator must exercise preventive maintenance to avert the corrosion of rotors and structural accessories (shields, carriers or trunnion rings). These parts are manufactured by the Drucker Company and are properly finished and checked in quality control facilities before they leave the factory.

7.1.2 Inspection

Before and after each run, examine all accessory parts for corrosion and cracks. Inspect the inside and bottom of the rotor cavities, shields and multiple-type carriers. If corrosion or cracks are discovered, immediately discontinue use of the part and replace it with the proper part manufactured by the Drucker Company.

7.1.3 Cleaning

The hazard of corrosion can be controlled and reduced by conscientious operator technique. After each run, it is advisable to rinse the test tube shield, carrier or trunnion ring in warm tap water and then in distilled water. If sample material has spilled into these parts, exercise proper laboratory protocol for the handling of spilled samples. As a minimum, wash the parts with a mild detergent solution, and scrub the cavities with a stiff test tube brush (without a sharp metallic point). Then rinse the parts in warm tap water and finally in distilled water. When particularly caustic materials are run, perform this cleaning procedure immediately upon termination of the run.

7.1.4 Drying and Storage

After the parts in section 7.1 have been thoroughly cleaned, dry them with a clean, absorbent towel. If a drying oven is used, the temperature must not exceed 80°C.

Store fixed-angle rotors open to the atmosphere with the cavities down. To expose the maximum surface area, store horizontal rotors upside down. Store shields and carriers with their cavities to the atmosphere. To prevent damage to anodized or other finished surfaces, store all parts on a soft surface.

7.2 Storage of the Centrifuge

If the Model 708T centrifuge is to be stored for long periods of time, it must be stored in a clean and dry atmosphere at moderate temperatures.

1. Coat the motor drive shaft and the interior of the rotor with protective lubricant.
2. Place the centrifuge in a clean plastic bag with a non-corrosive dehumidifying agent and seal the bag.
3. Store the centrifuge at 5°C to 30°C.

Caution: Do not store the centrifuge out of doors.

7.3 Daily Cleaning Procedure

No daily cleaning is required, except for accidental glass breakage or spillage in the rotor chamber. If either of these conditions occur, follow the steps below:

1. Use proper protective measures for the handling of spilled samples as outlined in your laboratory protocol.
2. Remove the rotor and accessories to obtain better access to the rotor chamber.
3. Using a damp cloth, wipe out the rotor chamber with water, or water and a mild detergent. Bleach is recommended as a disinfectant.

Caution: Wipe only, do not flush the guard bowl with water or any other liquid.

4. Using a clean damp cloth, wipe the rotor chamber again to remove any excess detergent.
5. Using a dry cloth, wipe the rotor chamber dry.

7.4 Weekly Cleaning Procedure

Perform weekly cleaning as follows:

1. Clean the centrifuge guard bowl and rotor with a mild detergent solution and hot water following the steps in section 7.3.
2. Clean the exterior of the centrifuge with a mild detergent solution and wipe dry with a towel.

8.0 VERIFICATION/CALIBRATION

The Model 708T centrifuge is factory set for calibration of speed and time. Once values are set for these operating conditions, they should not require calibration or maintenance. Errors in reading speed or time may signify damage to the timer, speed control, or sensors. To verify proper operation, follow the steps in sections 8.1 and 8.2.

8.1 Speed Verification/Calibration

Using a suitable rotor, set speed to 2000 RPM. Place a calibrated optical tachometer over the strobe port on the lid and measure the rotational speed of the rotor assembly. If the measured speed varies by more than 5% from the speed shown on the control panel, refer to "Troubleshooting", section 6.4.

8.2 Time Verification/Calibration

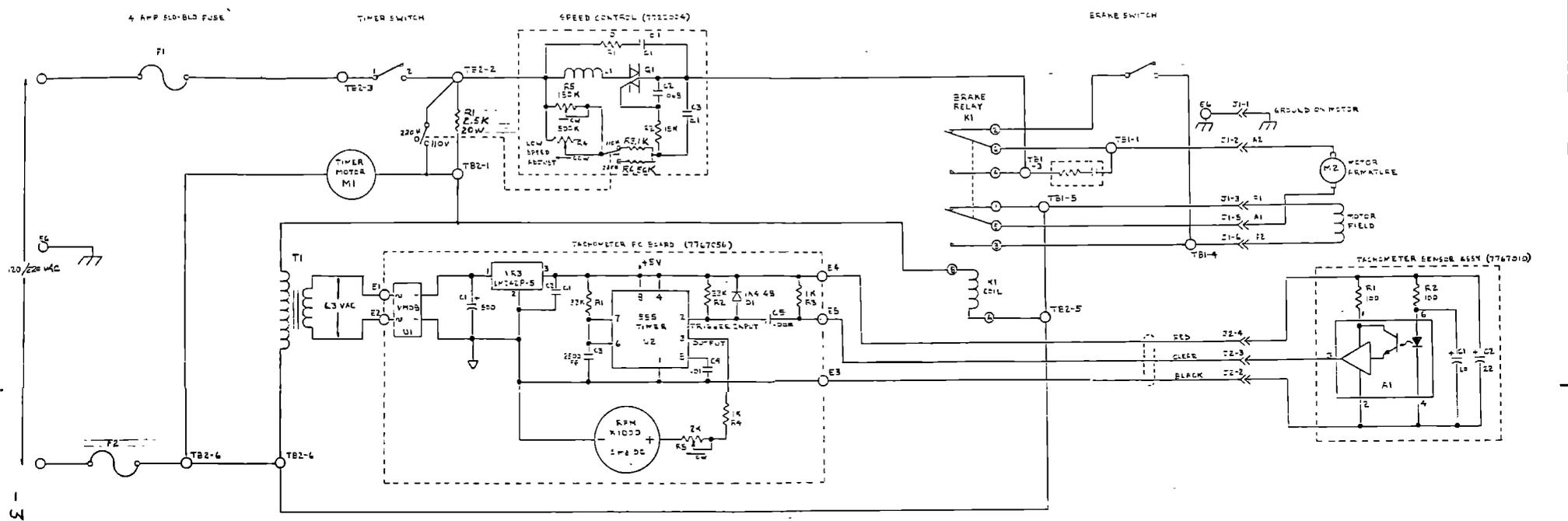
Check the time with a calibrated stop watch. If the measured time varies by more than 5% from the time shown on the control panel, replace the timer.

9.0 REQUIRED TEST EQUIPMENT

The following test equipment will be needed to verify the correct performance of the test:

1. Optical tachometer measuring device for measurement/ verification of the proper speed.
2. Stopwatch for the measurement/verification of the timer and elapsed time of the run.
3. Multimeter for electrical measurements per the schematic, continuity checks, etc.
4. Precision balance, either simple or double pan, capable of reading to 0.1 grams, for the verification of accessory weights and the measurement of sample weights.

REVISIONS						
REV	DATE	DESCRIPTION	EDD	DATE	BY	APP
A	1/58	RELEASED	PARSON	CG		
B	8/12/58	55 W LB 24		1/18	LF	
C	1/19/59	Added 10/22/58 AC Crossover			CH	EM

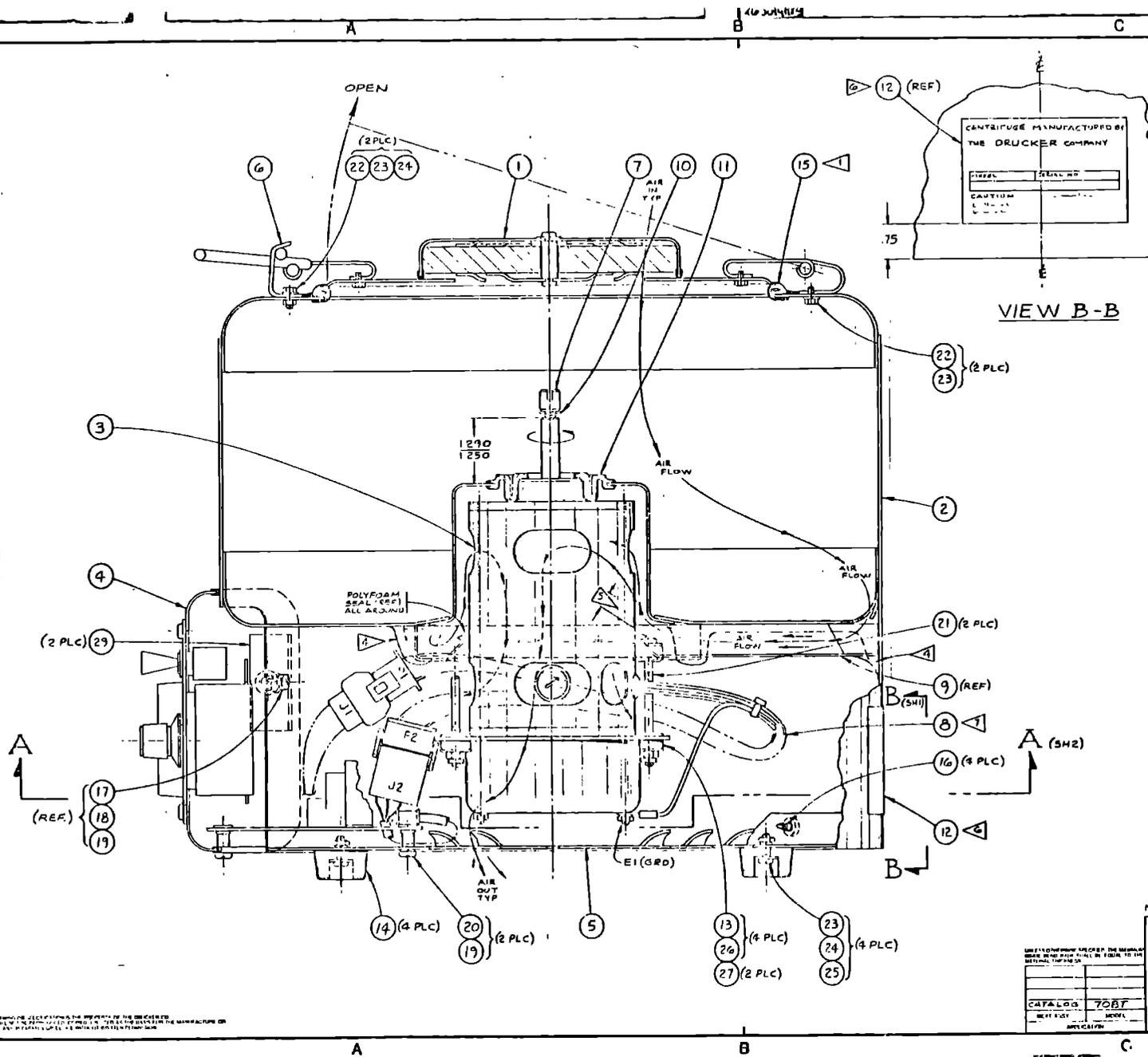


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DO NOT SCALE PRINT REMOVE BURRS & BREAK EDGES ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED	UNLESS OTHERWISE SPECIFIED, THE MAXIMUM MOUNTING HOLE SHALL BE EQUAL TO THE MATERIAL THICKNESS	UNLESS OTHERWISE SPECIFIED, THE MAXIMUM DIMENSIONS ARE AS FOLLOWS 3/16 TO 3/8 INCHES ANGULAR 3/32 TO 3/16 INCHES 45 & 90 DEGREES 3/16 TO 3/8 INCHES 45 & 90 DEGREES 3/16 TO 3/8 INCHES 45 & 90 DEGREES	DATE: 8/27/58 DRAWN: D. GILLETTE CHECKED: [Signature] APPROVED: [Signature] PART NAME NUMBER: 772304 SCALE: [Blank] SHEET: 1 OF 1	<p>THE DRUCKER COMPANY A DIVISION OF THE DRUCKER CORPORATION</p> <p>WIRING DIAGRAM, MODEL 708T</p>
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-32-



REV	DATE	BY	CHK	APP
A	RELEASED	11/83	PMG	KLW

VIEW B-B

- ▶ SEE WIRING DIAGRAM 7763041 FOR ELECTRICAL HOOKUP
- ▶ ATTACH ITEM (6) TO BACK OF BOWL AS SHOWN USING ADHESIVE BACKING THAT IS ON THE PART
- ▶ LOCATE POLYFOAM SEAL AS SHOWN TO ALLOW UNIFORM OPENING ALL AROUND FOR AIR PASSAGE AND MOTOR COOLING.
- ▶ SEAL AIR GAP WITH PERI-A-GUM #PP-300 OR EQUAL IN JOINTS INDICATED.
- ▶ BEND DOWN THIS CORNER TO CLEAR AIR CHANNEL ITEM (9) IN PLACE.
- ▶ INSTALL FASTENER WITH LOCTITE NO. 242
- ▶ BOND RUBBER ITEM (8) TO BOWL ITEM (2) USING 3M #8011 WEATHERSTRIP ADHESIVE AND SPLICE JOINT WITH SAME USING RUBBER CONNECTOR

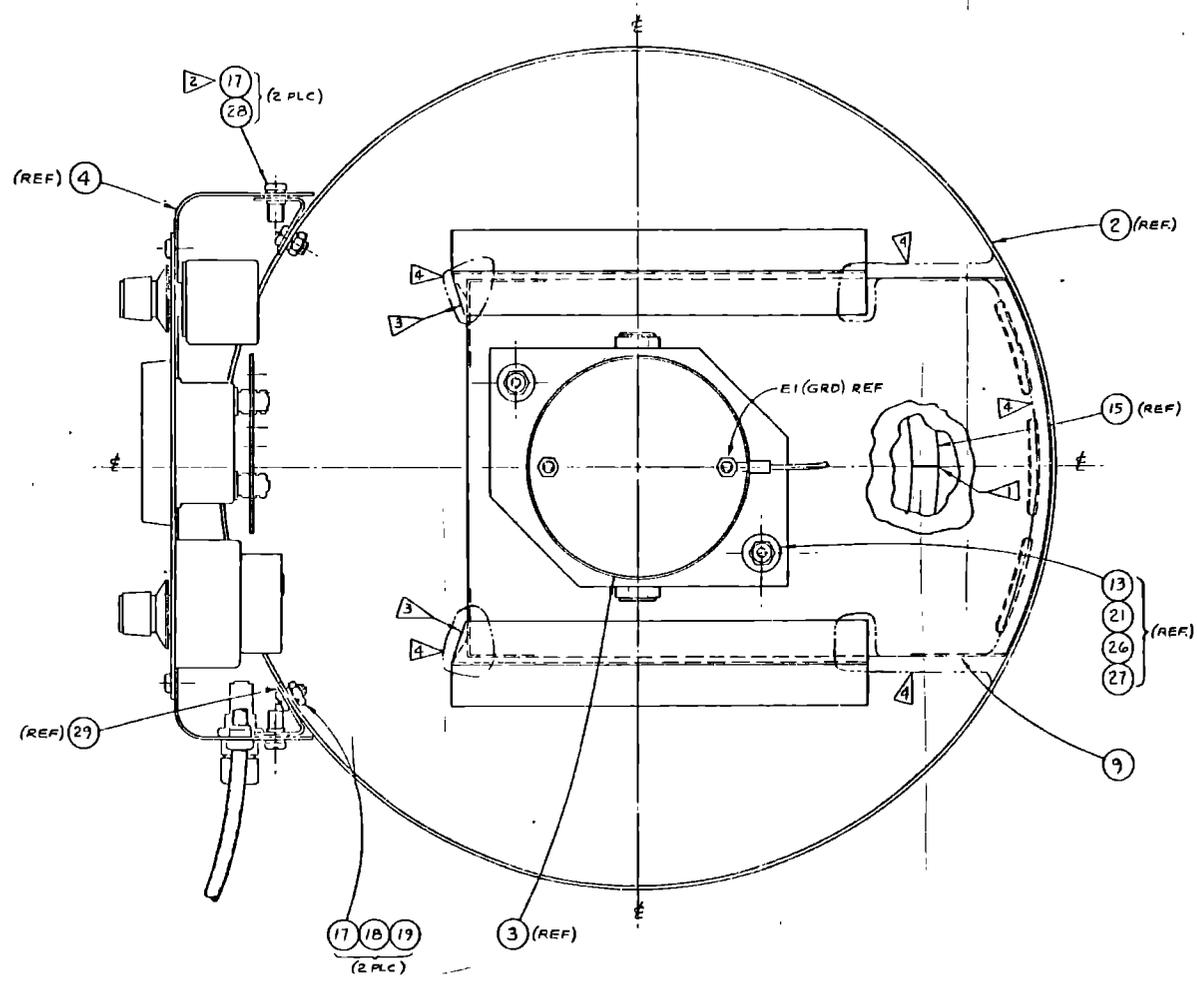
NOTES: A

DESIGNED BY	DATE	CHK	APP
12/12/78	11/83	PMG	KLW

THE DRUCKER COMPANY
 FINAL ASSY.
 MODEL 708T
 PART NO. 7767052 A
 SHEET FULL OF 2

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REV	DATE	BY	APP'D	QTY	REVISION
A				1783	RELEASED



SECTION A-A (FROM SH1)

- 33 -

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DRUCKER COMPANY 10000 W. 10th Ave. Denver, CO 80202		DATE: 11/16/72 BY: J. J. [Signature]	
DRAWN BY: J. J. [Signature]		CHECKED BY: [Signature]	
TITLE: FINAL ASSY, MODEL 70BT		PART NO: 7767052A	
QUANTITY: 1		SCALE: FULL	
DRAWING NO: 7767052A		SHEET NO: 2 OF 2	

A B C



THE DRUCKER COMPANY
A DIVISION OF COULTER CORPORATION

PARTS LIST

MODEL NO. 708T

DWG NO. PL- 7767052

REV. A

TITLE MODEL 708T FINAL ASSY

SHEET 2 OF 4

ITEM NO.	QUANTITY			MANUFAC.	MANUFACTURER'S PART NO.	DWG SIZE	7 DIGIT PART NO.	REFERENCE DESIGNATION	DESCRIPTION
1		1		TDC	708-M2	C	7768100		LID ASSY
2		1		TDC	708-M1	C	7770071		BOWL WELDMENT
3		1		TDC		D	7767053		MOTOR ASSY
4		1		TDC		D	7767055		INSTRUMENT PANEL ASSY
5	-3	1		TDC	708-M2036	D	7710213		BASE
6	-5	1		TDC	708-M2035	B	7710214		KEEPER
7		1		TDC	PDS-M1	A	7728100		SCREW, THUMB
8		R/D		TDC		D	7763041		WIRING DIAGRAM, 708T
9		1		TDC	708-1A2038	C	7714062		CHANNEL, AIR
10		1		TDC	PDS-R1	A	7728133		WASHER, RUBBER
11		1		TDC	PDS-R10	A	7714060		SHIELD, RUBBER
12		1		TDC		A	7724026		NAME PLATE, SERIAL



THE DRUCKER COMPANY
A DIVISION OF COULTER CORPORATION

PARTS LIST

MODEL NO. 708T

DWG NO. PL- 7767052

REV. A

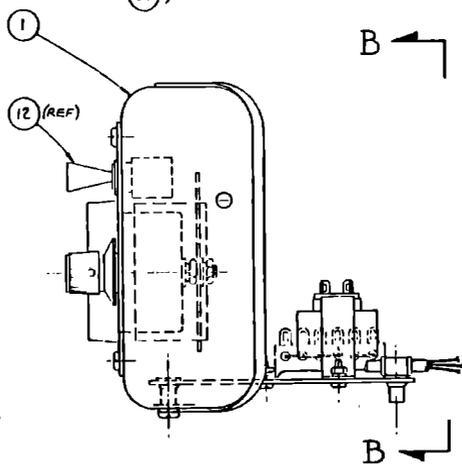
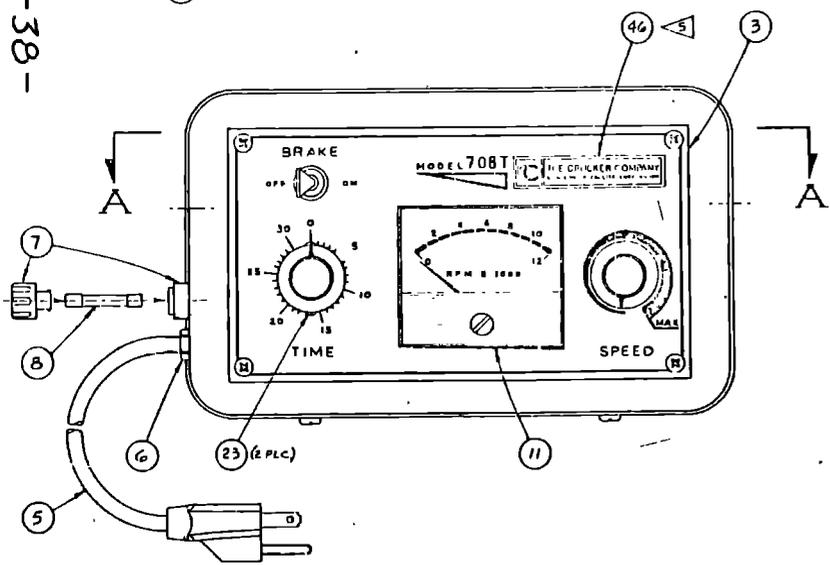
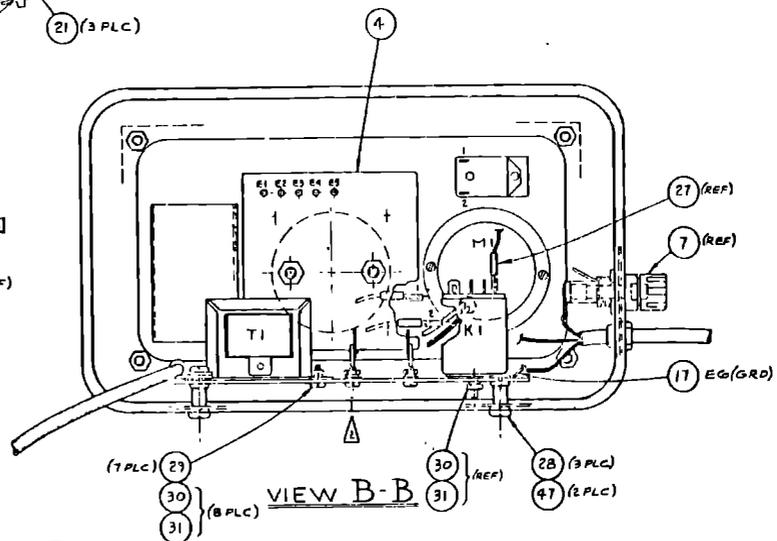
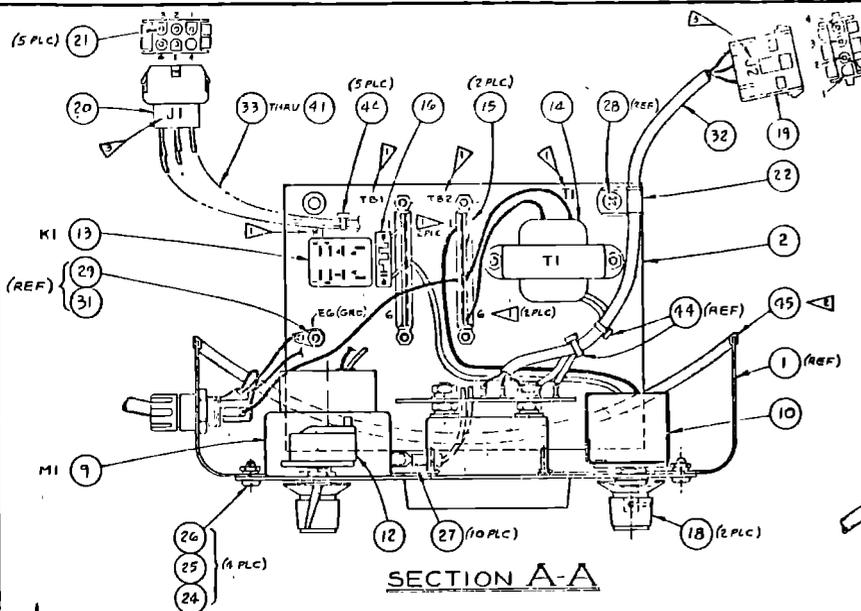
TITLE MODEL 708T FINAL ASSY

SHEET 3 OF 4

ITEM NO.	QUANTITY			MANUFAC.	MANUFACTURER'S PART NO.	DWG SIZE	7 DIGIT PART NO.	REFERENCE DESIGNATION	DESCRIPTION
13		4		LAVELLE	1107	-	7728102		GROMMET, RUBBER
14		4				-	7728052		FOOT, RUBBER
15		2.5		TDC	PDS-R7	B	7732001		SEAL RUBBER
16		4				-	7728106		SCREW, SHT METAL, #10-16 x .38
17		4				-	2810030		SCREW, #10-32 x .38 PPH MACH. (CRES)
18	-36-	2				-	2822016		NUT, HEX, #10-32 (CRES)
19		4				-	2826045		WASHER, LOCK, SPLIT #10 (CRES)
20		2				-	2810003		SCREW, #10-32 x .25 PPH MACH (CRES)
21		2				-	2808075		SCREW, #8-32 x 2.5 PPH MACH (CRES)
22		4				-	7728129		SCREW, #8-32 x 31 HEX HD MACH. (CRES)
23		8				-	2826048		WASHER, LOCK, SPLIT #8 (CRES)
24		6				-	2822011		NUT, HEX, #8-32 (CRES)
25		4				-	2808038		SCREW, #8-32 x .5 PPH MACH (CRES)

46 JULY 1954

REV.	DATE	BY	CHKD.	APP.
A	RELEASED		1/83	1/53



- 3 ATTACH ITEM ① TO PANEL AS SHOWN USING ADHESIVE BACKING THAT IS ON THE PART
- 4. SEE DRAWINGS 7763042 & 7763043 FOR WIRE CUT & ROUTING
- 5 USING 18 POINT HIGH CHARACTER PERMANENTLY MARK CONNECTOR HOUSINGS "J1" & "J2" AS SHOWN
- 6 BOND RUBBER ITEM ⑥ TO BEZEL ITEM ① USING 3M "BOII" WEATHERSTRIP ADHESIVE AND SPLICE JOINT WITH SAME.
- 7 PERMANENTLY MARK AS SHOWN: "T1", "T2", "1", "6", "T1" & "K1" RESPECTIVELY USING 18 POINT HIGH CHARACTERS.

NOTES:

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<p>7767052 708T</p> <p>NEXT Assy MODEL</p> <p>APPLICATION</p>	<p>SEE PARTS LIST</p>	<p>ASSEMBLY INSTRUMENT PANEL</p> <p>7767055 1A</p> <p>REV. FULL</p>

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THE DRUCKER COMPANY
A DIVISION OF COULTER CORPORATION

PARTS LIST

MODEL NO. 708T

DWG NO. PL- 7767055

REV. A

TITLE ASSY, INSTRUMENT PANEL

SHEET 2 OF 5

ITEM NO.	QUANTITY			MANUFAC.	MANUFACTURER'S PART NO.	DWG SIZE	7 DIGIT PART NO.	REFERENCE DESIGNATION	DESCRIPTION
1		1		TDC	M/F 7714056	D	7710230		BEZEL, INSTRUMENT
2		1		TDC		C	7768130		ASSY., MOUNTING PLATE, ELECT.
3		1		TDC		C	7724058		PANEL, INSTRUMENT
4		1		TDC		A	7767056		P.C. ASSY., TACH. READOUT, 708T
5		1				-	6007001		LINE CORD, 18 GA., 3 WIRE, SV, 8'
6	-40-	1				-	6010001		STRAIN RELIEF
7	-40-	1				-	2101005		FUSE HOLDER, 20A, 250V
8		1				-	5102018	F1	FUSE, 4A, SLO-BLO
9		1		ROBERT-SHAW	608-055	-	7722003	M1	TIMER, ELECTRIC, 30 MINUTE
10		1		KB	KBSR-14VNS	-	7722004		SPEED CONTROL MODULE
11		1		DIXSON	220T-6229	-	7729005		TACHOMETER, 0-1ma, 0-12000 RPM
12		1		CUTLER-HAMMER	8381K121C	-	7751045		SWITCH, SPST, 6A, 125V
13		1		P&B	K10P11A45	-	7745010	K1	RELAY, DPDT, 10A, 120V



THE DRUCKER COMPANY
A DIVISION OF COLTLER CORPORATION

PARTS LIST

MODEL NO.

708T

DWG NO.

PL- 7767055

REV.

A

TITLE

ASSY. INSTRUMENT PANEL

SHEET 3 OF 5

ITEM NO.	QUANTITY			MANUFAC.	MANUFACTURER'S PART NO.	DWG SIZE	7 DIGIT PART NO.	REFERENCE DESIGNATION	DESCRIPTION
14		1		TRIAD	F-13X	-	7756006	TI	TRANSFORMER, 6.3V, 0.6A
15		2				-	2110023	TB1 & TB2	TERMINAL STRIP, 6 POSITION
16		1		RIFA	PMR20S2	-	7727001	RC1	R/C NETWORK, 0.47 + 47Ω
17		1		H.H. SMITH	1416-8	-	7721063	EG	TERMINAL, SOLDER
18		2		ROGAN	RB671SK7M	-	7724001		KNOB, WHITE, W/SKIRT
19	-41-	1				-	2104359	J2	CONNECTOR HOUSING, 4 POSITION
20		1				-	2104355	J1	CONNECTOR HOUSING, 6 POSITION
21		8					-	2104349	SOCKET, 22-18 GA
22		1					-	6006002	CLAMP, CABLE, 0.187 I.D.
23		2				-	2804010		SCREW, 4-40 X 0.25, P.H., BLACK
24		4				-	2808048		SCREW, 8-32 X 0.375,
25		4				-	2826048		WASHER, SPLIT, #8
26		4				-	2822011		NUT, 8-32



REV	APPLICATION		REVISIONS				
	NEXT ASSY	MODEL	REV	DESCRIPTION	DATE	BY	APPV
A	7767055	708T	A	RELEASED E.C.O. 1183	28 AUG 81	D.G.	SKB

PART/DWG NUMBER
7763042

DWG
A
SIZE

REVISION	SHEET																			
STATUS	REVISION																			

UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE IN INCHES		DWN DON GILLETTE	DATE 27 AUG 81	 THE DRUCKER COMPANY A DIVISION OF COULTER CORPORATION									
TOLERANCES		CHK SKB	28 AUG 81										
<table border="1"> <thead> <tr> <th>LINEAR</th> <th>HOLES</th> </tr> </thead> <tbody> <tr> <td>.X = ±.1</td> <td>0 - .25 = ±.003</td> </tr> <tr> <td>.XX = ±.02</td> <td>.25 - .50 = ±.005</td> </tr> <tr> <td>.XXX = ±.005</td> <td>.50 - 1.0 = ±.008</td> </tr> <tr> <td>FRAC. = ±1/64</td> <td>1.0 - UP = ±.010</td> </tr> </tbody> </table>		LINEAR	HOLES		.X = ±.1	0 - .25 = ±.003	.XX = ±.02	.25 - .50 = ±.005	.XXX = ±.005	.50 - 1.0 = ±.008	FRAC. = ±1/64	1.0 - UP = ±.010	ENG
LINEAR	HOLES												
.X = ±.1	0 - .25 = ±.003												
.XX = ±.02	.25 - .50 = ±.005												
.XXX = ±.005	.50 - 1.0 = ±.008												
FRAC. = ±1/64	1.0 - UP = ±.010												
ANGULAR = ± 0° 30'		APPR: S.W. (30-7-81)	28 AUG 81	TITLE LIST, WIRE ROUTE, INSTRUMENT PANEL 708T									

MATERIAL:	DWG A SIZE	PART/DWG NUMBER 7763042	REV A
FINISH:	- 4 4 -		SCALE
CLASS. CODE	SHEET 1 OF 2		



WIRE ROUTE/SEQ. SHEET

OPER. OPERATION DESCRIPTION

ASSEMBLY NUMBER
7763042

REV.

NEXT ASSY/OPER.
7767055

PROCESS. ENG.

DATE
8/27/81

ASSEMBLY NAME

INSTRUMENT PANEL, 708 T

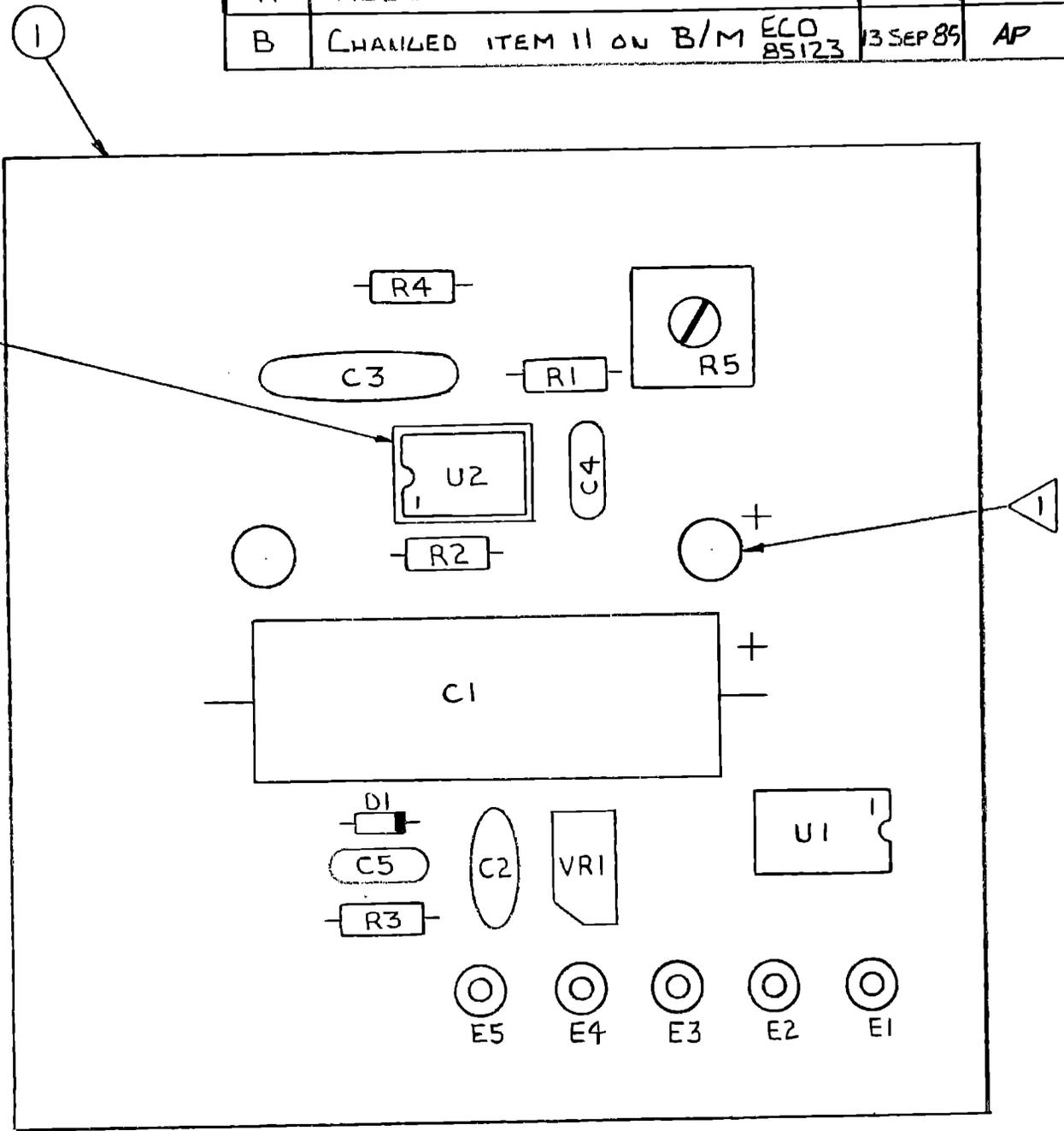
PROC. ISSUE

PAGE 2 OF 2

NUMBER	COLOR	GA.	LENGTH	FROM	TO
1	BARE, SOLID	20	0.5	TB2-1	TB2-2
2	↓ ↓	↓	↓	TB2-3	TB2-4
3	↓ ↓	↓	↓	TB2-5	TB2-6
4	BLACK	18	7.0	TB2-1	SPEED CONTROL
5	↓	22	8.0	TB2-1	KI-B
6	↓	22	5.0	TB2-2	TIMER MOTOR
7	↓	18	5.5	TB2-2	TIMER SW. 2
8	↓	18	5.0	TB2-3	TIMER SW. 1
9	↓	22	3.5	TB2-4	T1 PRIMARY
10	↓	18	6.5	TB2-4	FUSE
11	WHITE	22	6.0	TB2-5	KI-A
12	↓	18	1.5	TB2-5	TB1-5
13	↓	18	6.0	TB2-6	POWER CORD
14	↓	22	3.5	TB2-6	TIMER MOTOR
15	BLACK	22	4.0	TB2-6	T1 PRIMARY
16	ORANGE	18	8.0	TB1-1	KI-6
17	ORANGE	18	8.0	TB1-1	J1-2
18	WHITE	18	6.0	TB1-3	SPEED CONTROL
19	WHITE	18	7.5	TB1-3	KI-4
20	BLACK	18	7.0	TB1-4	KI-3
21	BLACK	18	8.5	TB1-4	J1-6
22	GREY	18	7.5	TB1-4	BRAKE SWITCH
23	BLACK	18	8.5	TB1-5	J1-3
24	WHITE	18	7.0	TB1-5	KI-1
25	GREEN	18	9.5	E6	J1-1
26	GREEN	18	2.5	E6	POWER CORD
27	GREY	18	9.5	KI-2	BRAKE SWITCH
28	GREEN	22	5.0	T1 SECONDARY	E1 (P.C. BOARD)
29	GREEN	22	5.0	" "	E2
30	BLACK *	22	12.0	J2-2	E3
31	RED *	22	12.0	J2-4	E4
32	CLEAR *	22	12.0	J2-3	E5 ↓ ↓
33	BLACK	18	2.0	FUSE	POWER CORD
34	YELLOW	18	7.0	KI-5	J1-5

REVISIONS

SYM.	DESCRIPTION	DATE	APPROVAL
A	RELEASED E.C.O. 1183	28 AUG 81	<i>SKB</i>
B	CHANGED ITEM 11 ON B/M ^{E.C.O.} 85123	13 SEP 85	AP



1 METER MOUNTING HOLE (2 PLCS)

MATERIAL			FINISH			HEAT TREAT		
DIMENSIONAL TOLERANCES UNLESS OTHERWISE NOTED			TITLE			WEIGHT		
FRAC.	DEC.	ANG.	P.C. ASSY, TACHOMETER READOUT, 708T			THE DRUCKER CO. MIAMI FL 33156		
±	±	±						
SCALE	NO. REQD.		DRAWN D. GILLETTE DATE 27 AUG. 81			SIZE	DRAWING NUMBER	ISSUE
NEXT. ASSY.			CHECKED <i>SKB</i> DATE 28 AUG 81			A	7767056	B
			APPROVED <i>S. Swiflow</i> DATE 28 AUG 81					



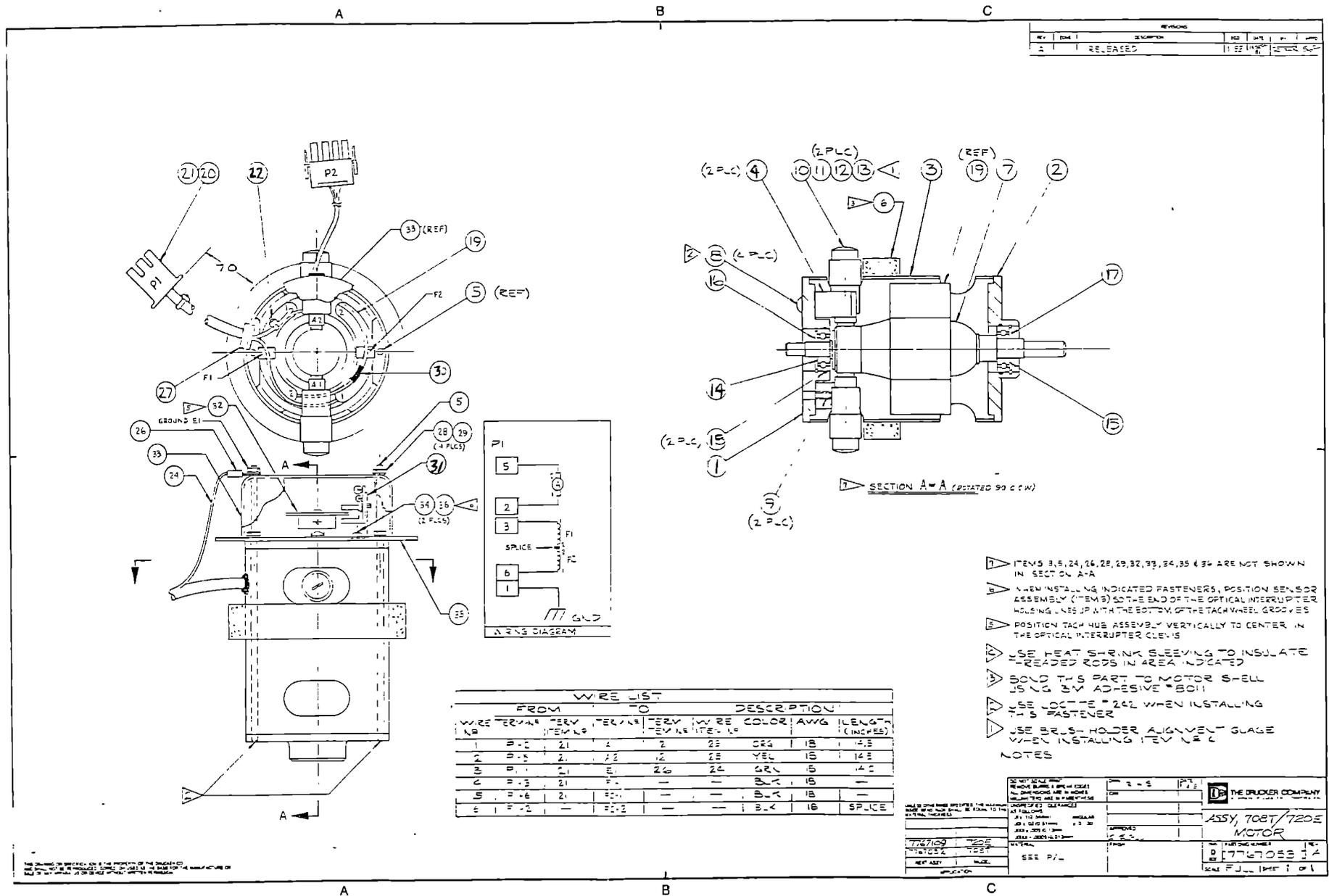
THE DRUCKER COMPANY
A DIVISION OF COULTER CORPORATION

PARTS LIST

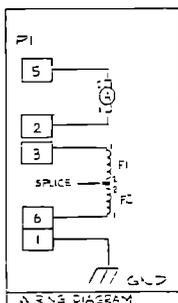
MODEL NO. 708T | DWG NO. PL- 7767056 | REV. A.
TITLE P.C. ASSY, TACH. READOUT | SHEET 2 OF 3

ITEM NO.	QUANTITY			MANUFAC.	MANUFACTURER'S PART NO.	DWG SIZE	7 DIGIT PART NO.	REFERENCE DESIGNATION	DESCRIPTION
1		1		TDC		D	7717018		P.C. BOARD, TACH. READOUT (BLANK)
2		5				-	2114002	E1-E5	TERMINAL, TURRET
3		1	SPRAGUE	500D-507G025		-	7715001	C1	CAPACITOR, ELECT., 500/25V
4		1				-	1501073	C2	CAPACITOR, DISC, 0.1/25V
5		1				-	1512034	C3	CAPACITOR, SILVER MICA, 2500 PF
6		1				-	1501058	C4	CAPACITOR, DISC, 0.01/50V
7	48-	1				-	1501031	C5	CAPACITOR, DISC, 0.001/1KV
8		2				-	4701047	R3, R4	RESISTOR, 1000Ω, 1/4W, 10%
9		1				-	4701109	R2	RESISTOR, 22K, 1/4W, 10%
10		1				-	4701118	R1	RESISTOR, 33K, 1/4W, 10%
11		1	SPECTROL	63M10Z		-	7747032	R5	POT., TRIMMER, 1K, 1/2W, 10%
12		1				-	2119039		SOCKET, I.C., 8 POSITION
13		1				-	4801009	D1	DIODE, IN4148

-50-



REV	DATE	DESCRIPTION	BY	CHKD	APP'D
1		RELEASED	11/22/88		



WIRE NO	FROM	TERMINAL	TERMINAL	WIRE TYPE	WIRE COLOR	AWG	LENGTH (INCHES)
1	P-2	21	2	22	CR2	18	14.5
2	P-5	21	22	22	YEL	18	14.5
3	P-1	21	E1	22	GRY	18	14.5
5	P-6	21	E1	—	BLK	18	—
6	P-2	21	F2	—	BLK	18	SPICE

- ▽ ITEMS 3, 5, 24, 26, 28, 29, 32, 33, 34, 35 & 36 ARE NOT SHOWN IN SECTION A-A
- ▽ WHEN INSTALLING INDICATED FASTENERS, POSITION SENSOR ASSEMBLY (ITEM 3) TO THE END OF THE OPTICAL INTERRUPTER HOLDING LINES UP WITH THE BOTTOM OF THE TACH WHEEL GROOVES
- ▽ POSITION TACH HUB ASSEMBLY VERTICALLY TO CENTER IN THE OPTICAL INTERRUPTER CLEVIS
- ▽ USE HEAT SHRINK SLEEVING TO INSULATE READED RODS IN AREA INDICATED
- ▽ BOLD THIS PART TO MOTOR SHELL USING 2X ADHESIVE BOLT
- ▽ USE LOCTITE 242 WHEN INSTALLING 1/8" FASTENER
- ▽ USE BRUSH HOLDER ALIGNMENT GLAZE WHEN INSTALLING ITEM 17

THE BUCKER COMPANY 17767053 1A SCALE: FJ... 1/16" = 1"	ASSY 708T/720E MOTOR 17767053 1A
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THE DRUCKER COMPANY
A DIVISION OF COULTER CORPORATION

PARTS LIST

MODEL NO. 708T

DWG NO. PL- 7767053

REV. A

TITLE ASSY, 708T MOTOR

SHEET 2 OF 4

ITEM NO.	QUANTITY			MANUFAC.	MANUFACTURER'S PART NO.	DWG SIZE	7 DIGIT PART NO.	REFERENCE DESIGNATION	DESCRIPTION
1			1	TDC	708-M2054	B	7712142		LOWER END BELL MOTOR
2			1	TDC	708-M2056	B	7712143		UPPER END BELL, MOTOR
3			1	TDC	708-M8	C	7770066		SHELL, WELDMENT
4			2	TDC	708-M2055	A	7712145		BRUSH HOLDER, MOTOR
5			2	TDC		A	7712236		TIE ROD, 708T MOTOR
6		-52-	1	TDC	PDS-M33	A	7710191		SEAL, POLYFOAM
7			1	MOTOR SPEC	20-1767	C	7735026		ARMATURE
8			4			-	2808038		SCR, 8 - 32 X .5
9			2			-	2807037		SET SCR. 8 - 32 X .25
10			2	PHNX	6020-S-CE-1332	-	7735021		BRUSH HOLDER
11			2	PHNX	BE-51	-	7735022		CAP, BRUSH HOLDER
12			2	PHNX	26-C	-	7735005		CLIP, TERMINAL
13			2	KC	PX-45G	-	7735023		BRUSH, CARBON



THE DRUCKER COMPANY
A DIVISION OF COULTER CORPORATION

PARTS LIST

MODEL NO. 708T

DWG. NO. PL- 7767053

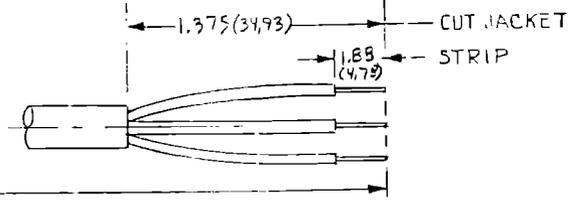
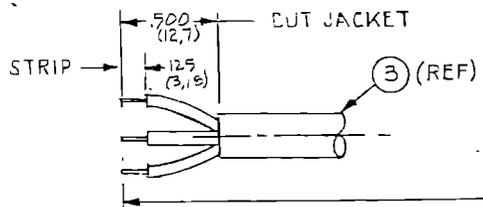
REV. A

TITLE ASSY , 708T MOTOR

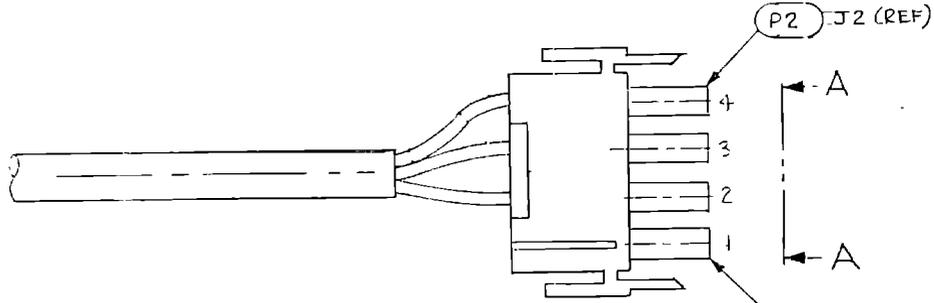
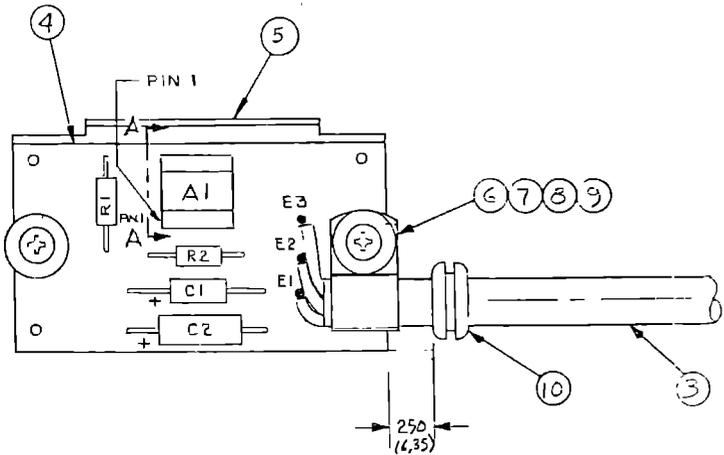
SHEET 3 OF 4

ITEM NO.	QUANTITY			MANUFAC.	MANUFACTURER'S PART NO.	DWG SIZE	7 DIGIT PART NO.	REFERENCE DESIGNATION	DESCRIPTION
14			1	SKF	R29 Z	-	7725039		BALL BEARING EXTRA SMALL
15			1	SKF	6001-2Z	-	7725040		BALL BEARING, EXTRA LIGHT
16			1	WT	N5000-102	-	7728108		RING, RETIANING, INT.
17			1	WT	N5000-112	-	7728109		RING, RETAINING, INT.
18			2		8-121	-	7725041		O-RING
19			1	MOTOR SPEC	40-1767	C	7735027		FIELD, MOTOR
20	-53-		1			-	2104354		CAP, 6 POS. U - M/L
21			5			-	2104348		PIN, U - M/L, 18 - 24 GA.
22			5			-	6011001		TIE, WIRE
23			1.2			-	6018050		WIRE, PVC, 18 GA., ORANGE
24			1.1			-	6018033		WIRE, PVC, 18 GA., GREEN
25			1.2			-	6018032		WIRE, PVC, 18 GA., YELLOW
26			1			-	2113010		RING, #10, RED

REVISIONS				
SYM	DESCRIPTION	BY	DATE	APPROVAL
A	RELEASED ECO. 1183	D.G.	9/9/81	[Signature]

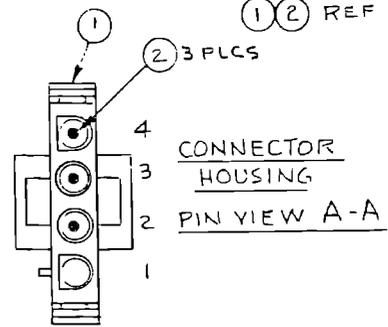


18.500 ± .250 (469,9 ± 6,35)



WIRE LIST

WIRE #	FROM		TO		DESCRIPTION			
	CONN	TERM	CONN	TERM	AWG	COLOR	LENGTH	WIRE IT NO
1	P2-1							
1	P2-2	(2)	E-1	-	22	BLACK	18.5(470)	3
2	P2-3	(2)	E-2	-	22	CLEAR	18.5(470)	3
3	P2-4	(2)	E-3	-	22	RED	18.5(470)	3



NOTE DIMENSIONS IN PARENTHESIS ARE IN MILLIMETERS

MATERIAL		FINISH			HEAT TREAT	
DIMENSIONAL TOLERANCES UNLESS OTHERWISE NOTED		TITLE			WEIGHT	
FRAC.	DEC.	ANG.	ASSY. 70BT, 720E			THE DRUCKER CO 3240 W 16TH AVE HIALEAH FL 33012
7767109	720E	=	=	=	TACH SENSOR	
7767053	70BT		.020			
NEAT ASSY	MODEL	SCALE	NO	REDD	DRAWN	D.G. LLETTE DATE 9 SEPT 81
APPLICATION		NO	1		CHECKED	SHE DATE 9 SEPT 81
					APPROVED	E [Signature] DATE 9/9/81
SIZE	DRAWING NUMBER	ISSUE				
C	7767054	A				

55

DRAWING COMP. FOR UTILITY, 10/10/80 BY SAN FRANCISCO, CA, 8/8/80



THE DRUCKER COMPANY
A DIVISION OF COULTER CORPORATION

PARTS LIST

MODEL NO.

MISC

DWG. NO.

PL- 7767054

REV. A

TITLE

ASSY, TACHOMETER SENSOR, 708T /720E

SHEET 2 OF 3

ITEM NO.	QUANTITY			MANUFAC.	MANUFACTURER'S PART NO.	DWG SIZE	7 DIGIT PART NO.	REFERENCE DESIGNATION	DESCRIPTION
1			1	AMP	1-480702		2104358		CONN, 4 COND. U/M & L PLUG
2			3	AMP	350690-1		7721001		PIN, U/M & L 24-18 GA
3			1.5	BELDEN	8771		6005002		CABLE, SHIELDED 3 COND.
4			1		XC2-331	C	7717004		BD, PC, TACH. SENSOR
5			1		XC2-335	B	7710014		BRACKET
6			1				6006002		CLAMP, CABLE -.187 ID
7		-56	2				2804005		SCREW, 4-40 X .25
8			2				2826002		WASHER, SPLIT LOCK #4
9			2				2827002		WASHER, FLAT #4
10			1				2830012		GROMMET .187 ID .437 OD .218 THK
R/D						B	7763002		SCHEM, TACH. SENSOR

THE DRUCKER COMPANY INTERNATIONAL
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TEL: (305) 746-8866; FAX: (305) 746-8899
