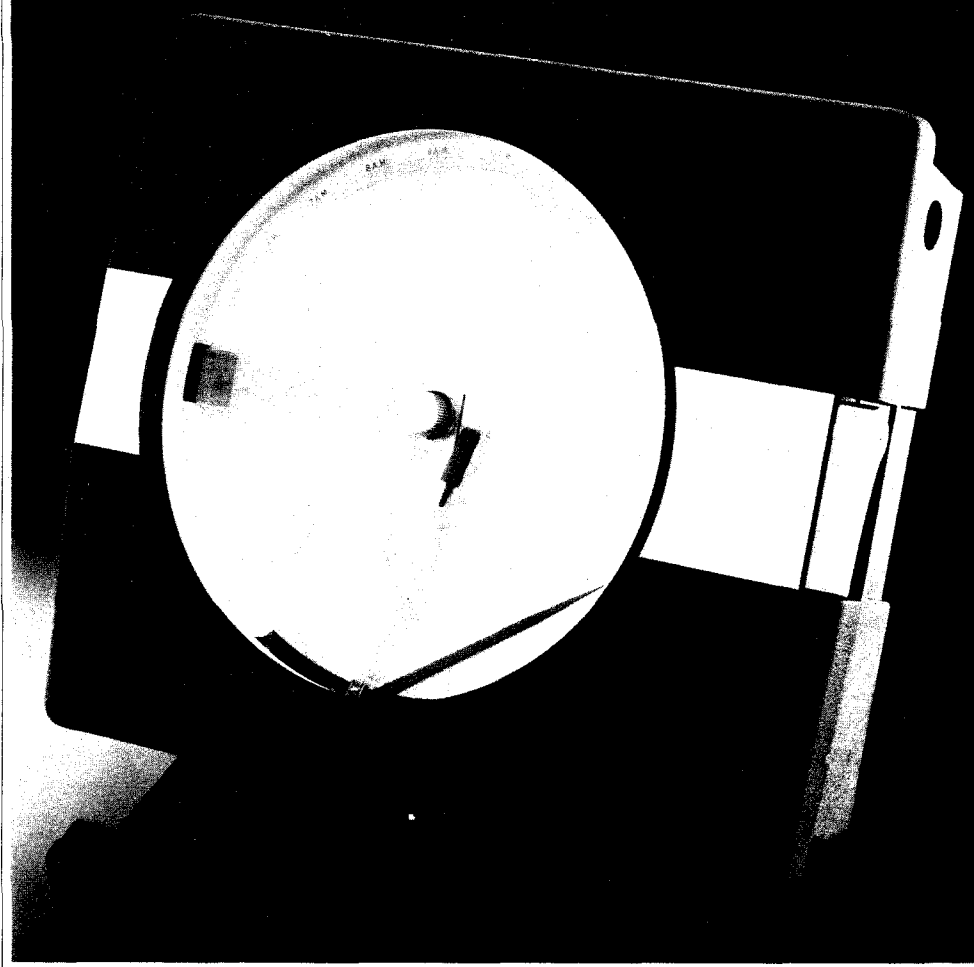


Form Number 3171
Pub. March 1991
First Edition

**SPECIFICATIONS
INSTALLATION
OPERATION**

MECHANICAL RECORDING MODULATING TEMPERATURE CONTROLLER

The RFP is a potentiometer type recording temperature controller designed for use with proportional positioning motors. It derives its simplicity and efficiency from the Piston-Pak filled systems sensing element.



RFP

Partlow

The Partlow Corporation • Two Champion Rd. • New Hartford, NY 13413 USA • 315-797-2222 • FAX 315-797-0403
QUALITY INSTRUMENTATION DESIGNED & MANUFACTURED IN THE USA

Dynapar, Veeder Root, and Eagle Signal Brands:

Sales, Repair, and Application Support:
1675 Delany Rd.
Gurnee, IL. 60031
847-662-4150 Sales/Order Entry Fax
847-782-5277 Applications Support Fax
800-873-8731 Sales/Order Entry
800-234-8731 Applications Support

NorthStar Brand:

Sales, Repair, and Application Support:
1675 Delany Rd.
Gurnee, IL. 60031
847-782-5288 Sales/Order Entry Fax
847-782-5277 Applications Support Fax
800-326-6216 Sales/Order Entry
800-326-6216 Applications Support

Partlow, West, Rustrak, and LFE Brands:

Sales, Repair, and Application Support:
1675 Delany Rd.
Gurnee, IL. 60031
847-662-4150 Sales/Order Entry Fax
847-782-5277 Applications Support Fax
800-873-8731 Sales/Order Entry
800-866-6659 Applications Support

Please disregard all phone numbers and addresses in this manual. The phone numbers and address on this page are the correct phone number and addresses to use for sales, repair, and application support.

RFP PRODUCT SPECIFICATIONS

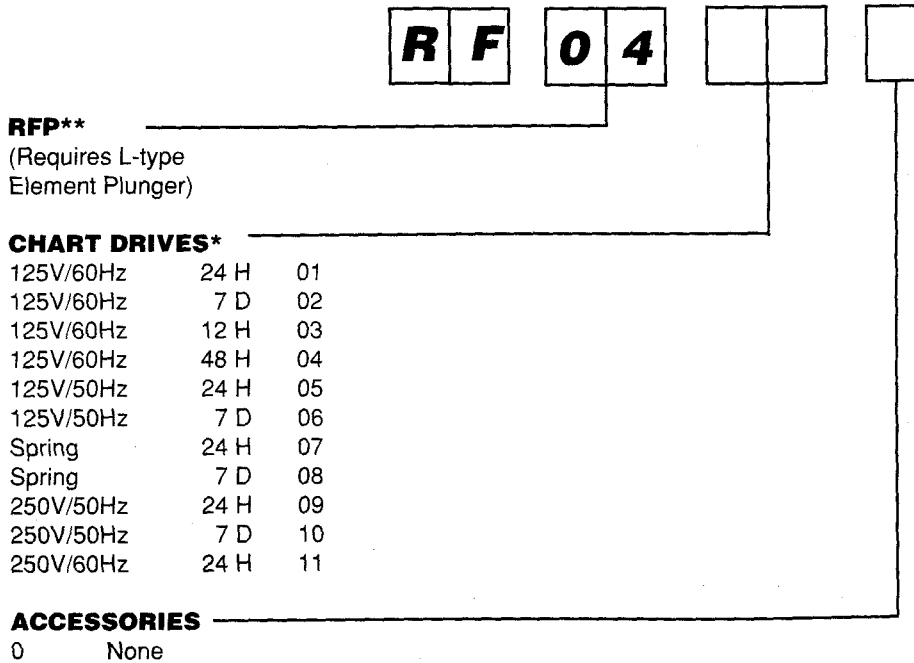
Dimensions	15 1/8"W X 13 13/16"H X 4 7/8"D
Surface Mounting	Brackets included
Flush Mount Cutout	13 1/2" W X 12 11/16"H
Chart Diameter	10 inch
Chart Marking	Felt Tip Cartridge
Chart Drive	Electric with toggle switch, or spring wound
Chart Rotation Periods	24 and 48 hour, 7 day, other options
Conduit Openings	One 7/8 inch diameter hole on each side of the case for 1/2 inch conduit fitting; drill guide hole spotted in the rear of the case showing optional rear conduit location.
Coil Resistance	135 ohms, std; others available as field installable kits.
Electrical Rating	Max. volts - 30; max. watts - 3.
Electrical Hookup	Terminal block accessible with hinged cover open.
Coil Length and Throttling Range Available	5/16" - 12%, std; 1/8" - 5%, 5/8" - 24% are available as field installable kits.
Rated Accuracy	1% of element range.
Approx. Net Weight*	12 lbs.
Approx. Shipping Weight*	17 lbs

* Weight may vary depending on element length.

Note:
 It is strongly recommended that Partlow equipped applications incorporate a high or low limit protective device which will shut down the equipment at a preset temperature condition in order to preclude possible damage to property or product.

This document should accompany the instrument to its final installation in order to provide operational and service assistance to the end user.

RFP ORDER MATRIX



* Price includes 100 ink type charts.

** The potentiometer coil kits listed below are available. They are ordered separately and installed by the user

Description	Order Number
100 Ohm 1/8"	64403504
100 Ohm 5/16"	64403505
135 Ohm 1/8"	64403501
135 Ohm 5/8"	64403502

PISTON-PAK THERMAL SENSING ELEMENT

A Piston-Pak Thermal Sensing Element must be specified for each RFP. Use Partlow Form 3028 "Mechanical Instrumentation Products Cross Reference and Pricing Guide" to configure the matrix number for the sensing element.

INSTALLATION

LOCATION

The element head assembly is subject to ambient temperature limitations of -30°F to 125°F (-35°C to 52°C) for low temperature head assemblies, and 32°F to 150°F (0°C to 66°C) for high temperature head assemblies. These temperature limitations must be considered when determining the instrument's location. It should be located in an area as free from vibration as possible.

MOUNTING

The instrument(s) are shipped to be surface mounted. Figure 1 illustrates hole placement for surface mount condition.

Note: Holes in brackets supplied are 9/32 clearance holes for 1/4" bolts. The four holes called out in the drawing may be any size that will accommodate the fastening requirement, ie: 9/32 for 1/4" thru-bolt with nut fastening, or #7 drill for 1/4" x 20 NC tapped hole fastening or #3 drill for 1/4" x 28 NF tapped hole fastening.

The instrument may also be flush mounted. This is accomplished by removing the two surface mounting angle brackets from the instrument. Figure 1A illustrates panel cut out dimensions. Cut the panel opening to 13 1/2" x 12 5/8". Drill 9/32 clearance holes in four locations if 1/4" thru-bolt with nut installation is desired. Should a tapped hole be preferable, drill a #7 hole in four locations for 1/4" x 20 NC or a #3 hole in four locations for a 1/4" 28 NF. **Note: All configurations require a flat head screw for proper door operation. With the instrument in the upright position, insert it and the element with the panel opening and tilt into place.**

Depending upon your panel size it may be easier to make electrical connections before finally securing the instrument into the panel.

WIRING

Check applicable electrical codes, ordinances and regulations regarding use of conduit, etc. If acceptable, make connection using short sections of flexible cable or conduit. The rear conduit hole should be used for panel mount installations. A drill guide hole is spotted in the back of the case to accommodate field drilling (see Dimensional Drawing on Page 6). Refer to the wiring diagram in Figure 2 and proceed. Open the instrument's hinged cover and remove the insulator covering connection terminal block. Note: the terminals are designated 1, 2. Connect the power supply specified to terminals 1 and 2 (chart drive terminals) according to Figure 2. Terminals HCL are for proportional motor positioning (this is a lower voltage circuit, 30 volts max). Re-install insulator over terminal block and close the instrument cover.

PLACING THE THERMAL SENSING ELEMENT

Locate the thermal sensing bulb in the most agitated part of the medium to be measured and completely immerse it. (When U and Y type bulbs are used, note separation coupling between bulb and capillary). Be sure to immerse the element up to the coupling for correct temperature indication. Do not bend capillary to less than 1/2 inch radius and never bend it too close to the element bulb or element head. Pencil type bulbs must never be bent as this will affect instrument accuracy. U and Y-type bulbs may be bent but never to less than a two inch radius. Anchor the excess capillary securely to prevent vibration damage. These bulbs may be elevated up to 40 feet above the instrument without affecting calibration. For elevations over 40 feet consult with your local Partlow Representative, Distributor or the Factory.

Figure 1 - Surface Mount Dimensions

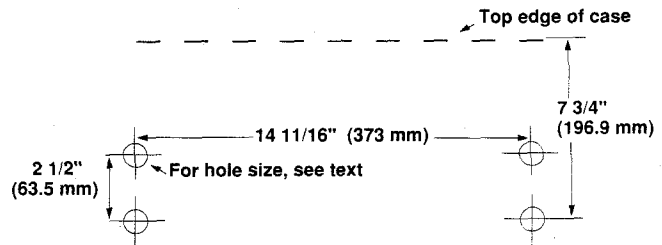


Figure 1A - Panel Cutout Illustration (in inches)

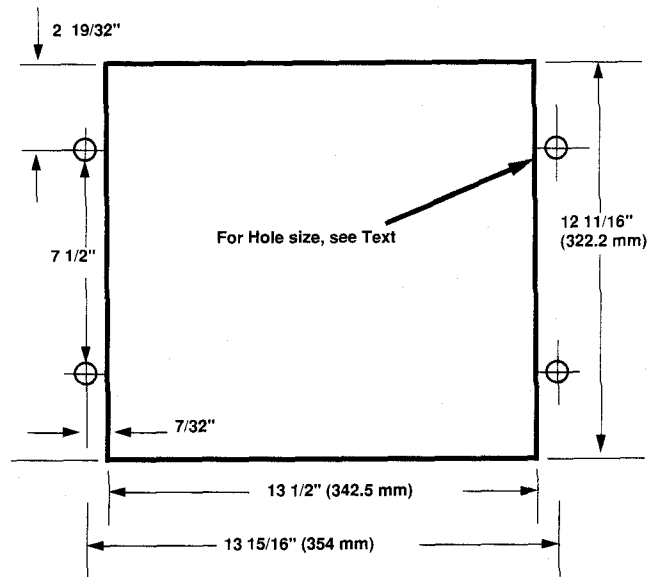
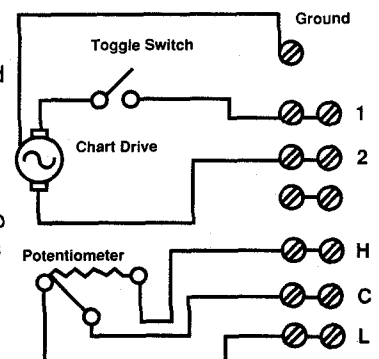


Figure 2 - Wiring Connections



STUFFING BOX INSTALLATION (IF APPLICABLE)

Overtightening of 21-T-105 steel or stainless steel stuffing boxes can damage the thermal element by restricting the capillary bore. To prevent damage, the stuffing box gland nut should be turned 1/2 to 3/4 of a revolution from a finger tight position. This is equivalent to a torque of 65 to 100 inch-pounds for steel and 130 to 180 inch-pounds for stainless steel.

INSTRUMENT OPERATION

Prior to putting the instrument into service, check it against an accurate test thermometer. As with any precision instrument minor adjustments may be necessary after shipment and installation. If you are unfamiliar with how to perform this check refer to the CHECKING TEMPERATURE and RE-ZEROING section of this document, below.

The potentiometer coil, which moves with the red set pointer, is positioned as the control point by turning the setting lever under the hinged cover of the instrument.

The pen arm, which moves upscale or downscale in response to the thermal sensing element, also slides the contact finger along the potentiometer coil within the modulating range. The control is factory adjusted so that the wiper arm is at mid-point or 50% of coil value when pen and set pointer are aligned. To adjust in field, see PEN ALIGNMENT section.

Basically, the control potentiometer coil forms half of a Wheatstone Bridge circuit, while the other half of the bridge is formed by a similar coil built into the proportional positioning motor. Although not absolutely necessary, the resistance of the control coil should be matched to the resistance of the motor coil.

A detector relay, either incorporated into the proportional motor or operating as a separate unit, detects any imbalance between the two coils of the Wheatstone Bridge circuit. When the control temperature changes, moving the control wiper to a new position on the control coil, the proportioning motor wiper moves on its coil in the direction necessary to restore a balanced circuit. The output shaft of the positioning motor, turning in response to the motor wiper and connected through linkage to valves, dampers, etc., regulated fuel flow to maintain temperature.

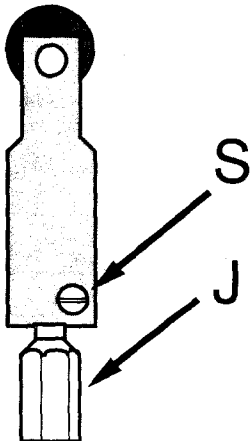
MAINTENANCE**CHECKING TEMPERATURE**

When checking and verifying your temperature be sure to use a test thermometer of known accuracy. Position the test thermometer sensing bulb or probe adjacent to the thermal sensing bulb from the RFP. Position the red set pointer along chart to the desired process temperature. Wait for the temperature to stabilize, then compare the test thermometer reading with that of the RFP. If the two readings do not agree, the RFP should be re-zeroed.

RE-ZEROING

Be sure that the process temperature is stable. Open instrument cover and loosen the set screw S (Figure 3, at left). Zeroing is accomplished by turning hex shaft J with the wrench provided. Lengthening shaft J (counterclockwise) raises pen indicated temperature, shortening shaft J (clockwise) lowers pen reading. Turn shaft J accordingly to correct the pen reading. Re-tighten set screw S. Check the adjustment by allowing the temperature to stabilize and compare the readings. Repeat these steps if necessary.

Figure 3 - Re-Zeroing



PEN ALIGNMENT

Inherent with any modulating-type control, equilibrium condition is reached at different percentages of heat available with each application. Hence, the recording pen may settle out either slightly higher or lower than the set pointer and must be compensated in order to achieve the control temperature required. To bring pen into alignment with set pointer, turn adjusting screw M, accordingly, until corrected (Figure 4, below). After each screw M adjustment, allow adequate time for pen to settle out. Repeat this procedure until properly aligned; several fine screw M adjustments may be necessary.

BRAKE TIGHTENING

Periodically the setting shaft brake may require tightening. If the brake is too loose, the overtravel movement of the black indicating pointer will tend to drag the set pointer upscale from its set position. To tighten the brake, turn the adjustment screw U clockwise (Figure 5, below). Do not over-tighten.

PISTON-PAK THERMAL SENSING ELEMENT IDENTIFICATION

An element designation number is stamped on the bottom of the element head. This is a coded description of the element specifications and should be used whenever a replacement element is ordered. The number appearing on the side of the element head (Figure 6, below) is the element age code, which may be required in establishing warranty.

ORDERING SPECIFYING THE PISTON-PAK SENSING ELEMENT

The sensing element is ordered separately from the RFP and requires its own matrix number. To determine the correct sensing element configuration for your instrument(s) and application, see Partlow Form 3028 "Mechanical Instrumentation Products Cross Reference and Pricing Guide."

Figure 4 - Pen Adjustment

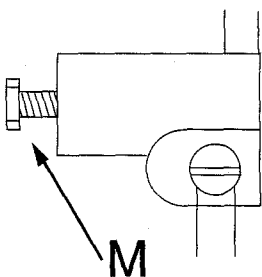


Figure 5 - Brake Tightening

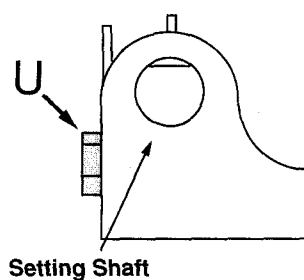
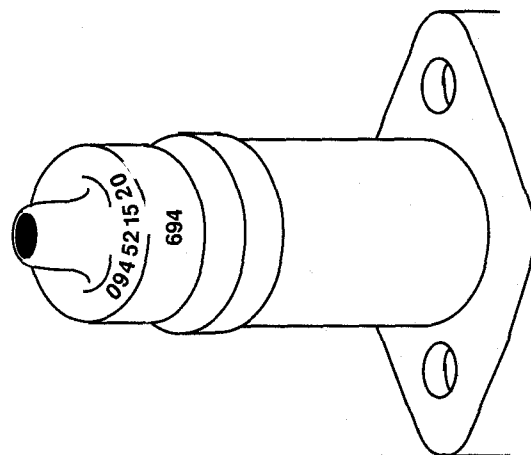


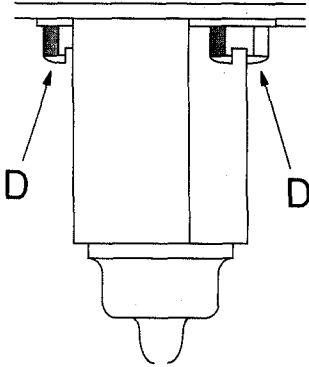
Figure 6 - Element ID



ELEMENT REPLACEMENT

To change a thermal sensing element, start by removing screws D (Figure 7, below) and withdrawing the element from the instrument body. Then remove the element bulb from the medium. Install the new element and replace screws D. Insert the new element bulb into the medium being measured.

Figure 7 - Element Replacement



Note: After the element has been replaced, check the temperature setting, re-zeroing may be necessary. If so, see the CHECKING TEMPERATURE section (page 4).

Caution: The inside mechanism(s), particularly the inside of the element housing, should never be oiled. However, if the instrument is subject to corrosion or gunking conditions, the mechanical linkage should be sprayed periodically with corrosion inhibiting CRC2-26, 3-36, or 5-56. Use only CRC2-26, 3-36, or 5-56 as other lubricants may cause build up and sticking of internal parts. Also note that the latch handle assembly should never be lubricated with any chemical. On plastic type door housings the latch may be lubricated using graphite. On aluminum dye cast type door housings, the latch may be lubricated using the same lubricant used on the mechanism. CRC2-26 may be purchased from Partlow in a 15 oz. container (part #63600401). CRC5-56 may be purchased locally from any hardware or automotive store.

DIMENSIONAL DRAWING

Figure 8 - Dimensional Drawing

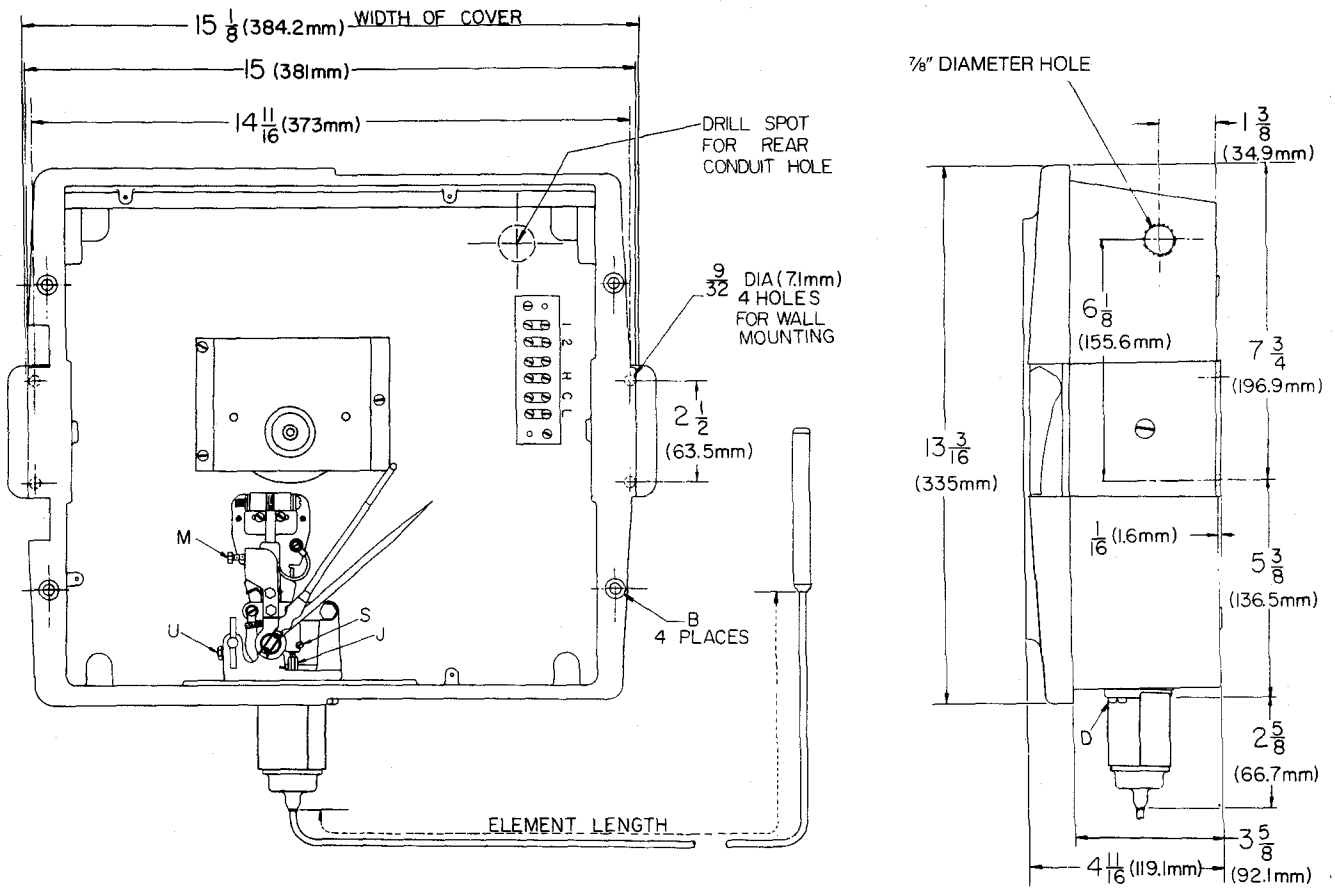
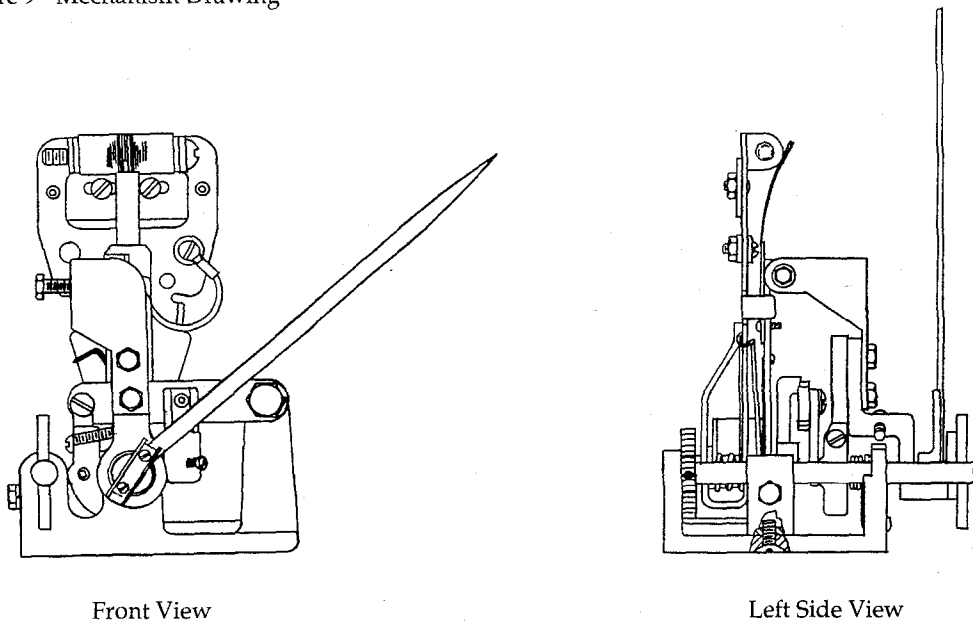


Figure 9 - Mechanism Drawing



EXPLODED ILLUSTRATION AND PARTS LIST

1. Case Assembly

Includes: Case, Ground Plane, Latch Bracket, Mounting brackets with screws, hinge pins and plates, hub strip hinge.

64415101

2. Cover Assembly

Includes: Cover glass, Gauge glass, glass retaining ring, gaskets, latch handle assembly.

SP50007603

3. Mechanism Assembly

Includes: 5/14 Potentiometer, wiring, push rod, and ink cartridge.

10068808

4. Main Lever Assembly

Includes: Main lever with push rod cap, push rod, set screw.

64414801

5. Potentiometer Coil Assemblies

Includes Coil, Mounting Hardware
1/8" sensitivity
5/16" sensitivity
5/8" sensitivity

64403501
64403502
64403503

6. Pen Arm Kit

Includes: Arm Cartridge and Screws.

64402201

Cartridge - red, in multiples of 5

60500403

7. Terminal Clock Kit

Includes: Terminal Block, Insulators, Misc. hardware

For 6 Position
For 9 Position
For 12 Position
For 14 Position

64415002
64415003
64415004
64415005

8. Chart Drive Nut and Flange Kit

(Indicate the type of application this is for)
Includes: Hub nut retaining clip and Flange assembly

For Stand Mounted Drives
For Platen Mounted Drives

9. Chart Drive Hub Name Strip

(CCW Chart Rotation)

10. Platen Assembly

For Spring Wound or Electric Drives, Stand or Platen mounted.

Includes: Chart Drive Switch

11. Chart Drive

Contact factory for re-order. Specify time base, voltage, cycle, and stand or platen mounted device being replaced

12. Chart Drive Mounting Stand

(Not required for Platen mounted drives)

Includes: All fasteners and Clamp Plate.

For All Electric Stand Mounted
For 24 Hour & 7 Day Spring Wound

13. Hardware Kit (not shown)

Includes: All Body Fasteners and Element Flange Screws (may include fasteners not required for specific models)

Warranty

These products are sold by The Partlow Corporation ("Partlow") under the warranties set forth in the following paragraph. Such warranties are extended only with respect to a purchase of these products, as new merchandise, directly from Partlow or from a Partlow distributor, representative or reseller, and are extended only to the first buyer thereof who purchases them other than for the purpose of resale.

These products are warranted to be free from functional defects in materials and workmanship at the time the products leave the Partlow factory, and to conform at that same time to the specifications set forth in the relevant Partlow instrumentation sheet, sheets, manual or manuals for such products.

Partlow's sole and exclusive obligation and buyer's sole and exclusive remedy under the above warranties is limited to repairing or replacing, at Partlow's option free of charge, the products which are reported in writing to Partlow at its main office - The Partlow Corporation, 2 Campion Road, New Hartford, New York 13413 or FAX MAIL 1-315-797-0403 and which if so advised by Partlow, are returned with a statement of the observed deficiency to the designated facility during normal business hours, transportation charges prepaid and which upon examination by Partlow are found not to comply with the above warranties. PARTLOW SHALL NOT BE LIABLE FOR ANY INCIDENTAL DAMAGES, CONSEQUENTIAL DAMAGES, SPECIAL DAMAGES, OR ANY OTHER DAMAGES, COSTS OR EXPENSES, EXCEPTING ONLY THE COST OR EXPENSE OF REPAIR OR REPLACEMENT AS ABOVE DESCRIBED. THERE ARE NO EXPRESSED OR IMPLIED WARRANTIES WHICH EXTEND BEYOND THE WARRANTIES HEREIN ABOVE SET FORTH. PARTLOW MAKES NO WARRANTY OR MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE PRODUCTS.

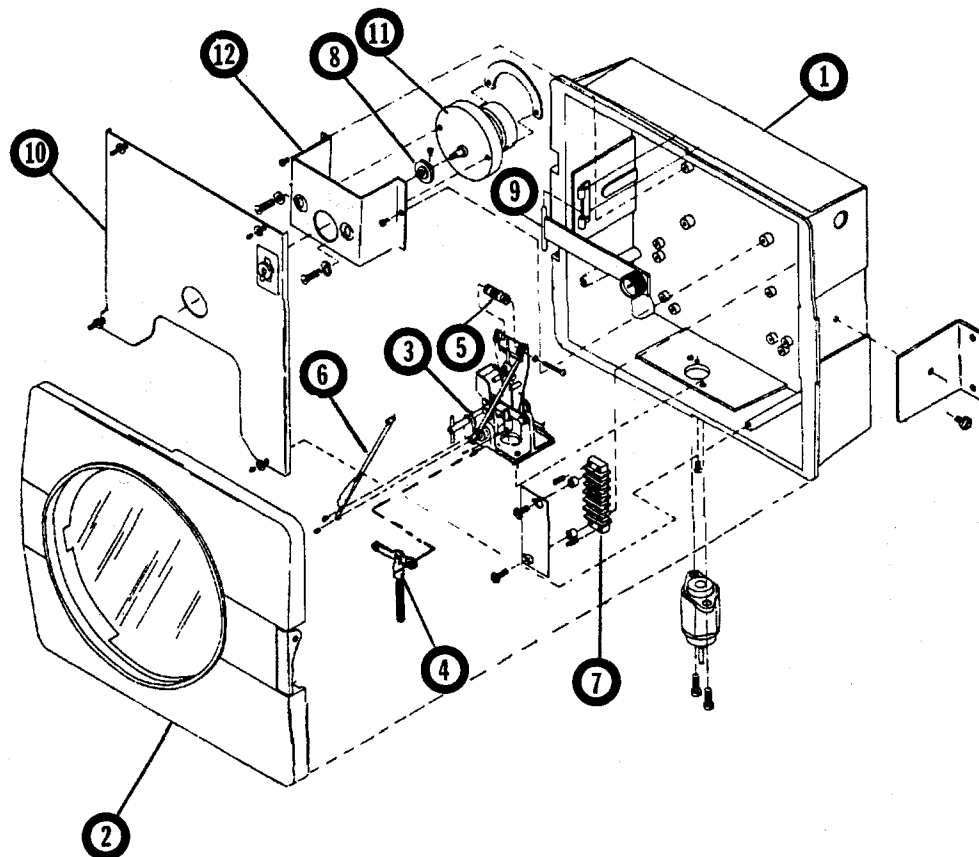
64415201
64415202

RFS12

SP10067701

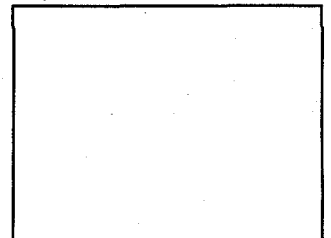
64415601
64415602

64415701



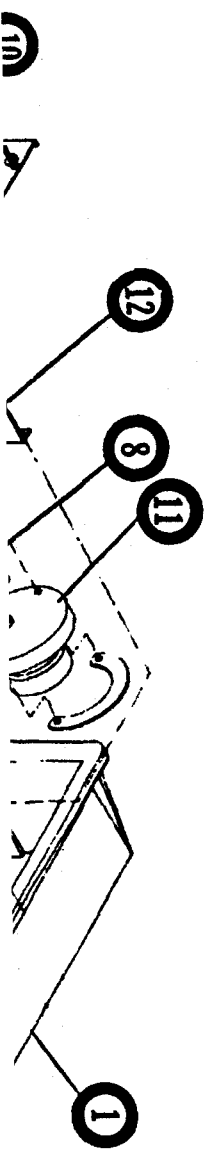
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EXPLODED ILLUSTRATION AND PARTS LIST

- 1. Case Assembly**
Includes: Case, Ground Plane, Latch Bracket, Mounting brackets with screws, hinge pins and plates, hub strip hinge.
64415101
- 2. Cover Assembly**
Includes: Cover glass, Gauge glass, glass retaining ring, gaskets, latch handle assembly.
SP50007603
- 3. Mechanism Assembly**
Includes: 5/14 Potentiometer, wiring, push rod, and ink cartridge.
10068808
- 4. Main Lever Assembly**
Includes: Main lever with push rod cap, push rod, set screw.
64414801
- 5. Potentiometer Coil Assemblies**
Includes Coil, Mounting Hardware
1/8" sensitivity **64403501**
5/16" sensitivity **64403502**
5/8" sensitivity **64403503**
- 6. Pen Arm Kit**
Includes: Arm Cartridge and Screws.
64402201
Cartridge - red, in multiples of 5 **60500403**
- 7. Terminal Clock Kit**
Includes: Terminal Block, Insulators, Misc. hardware
For 6 Position **64415002**
For 9 Position **64415003**
For 12 Position **64415004**
For 14 Position **64415005**
- 8. Chart Drive Nut and Flange Kit**
(Indicate the type of application this is for)
Includes: Hub nut retaining clip and Flange assembly
For Stand Mounted Drives **64415201**
For Platen Mounted Drives **64415202**
- 9. Chart Drive Hub Name Strip**
(CCW Chart Rotation) **RFS12**
- 10. Platen Assembly**
For Spring Wound or Electric Drives, Stand or Platen mounted.
Includes: Chart Drive Switch **SP10067701**
- 11. Chart Drive**
Contact factory for re-order. Specify time base, voltage, cycle, and stand or platen mounted device being replaced
- 12. Chart Drive Mounting Stand**
(Not required for Platen mounted drives)
Includes: All fasteners and Clamp Plate.
For All Electric Stand Mounted **64415601**
For 24 Hour & 7 Day Spring Wound **64415602**
- 13. Hardware Kit (not shown)**
Includes: All Body Fasteners and Element Flange Screws (may include fasteners not required for specific models) **64415701**



Warranty

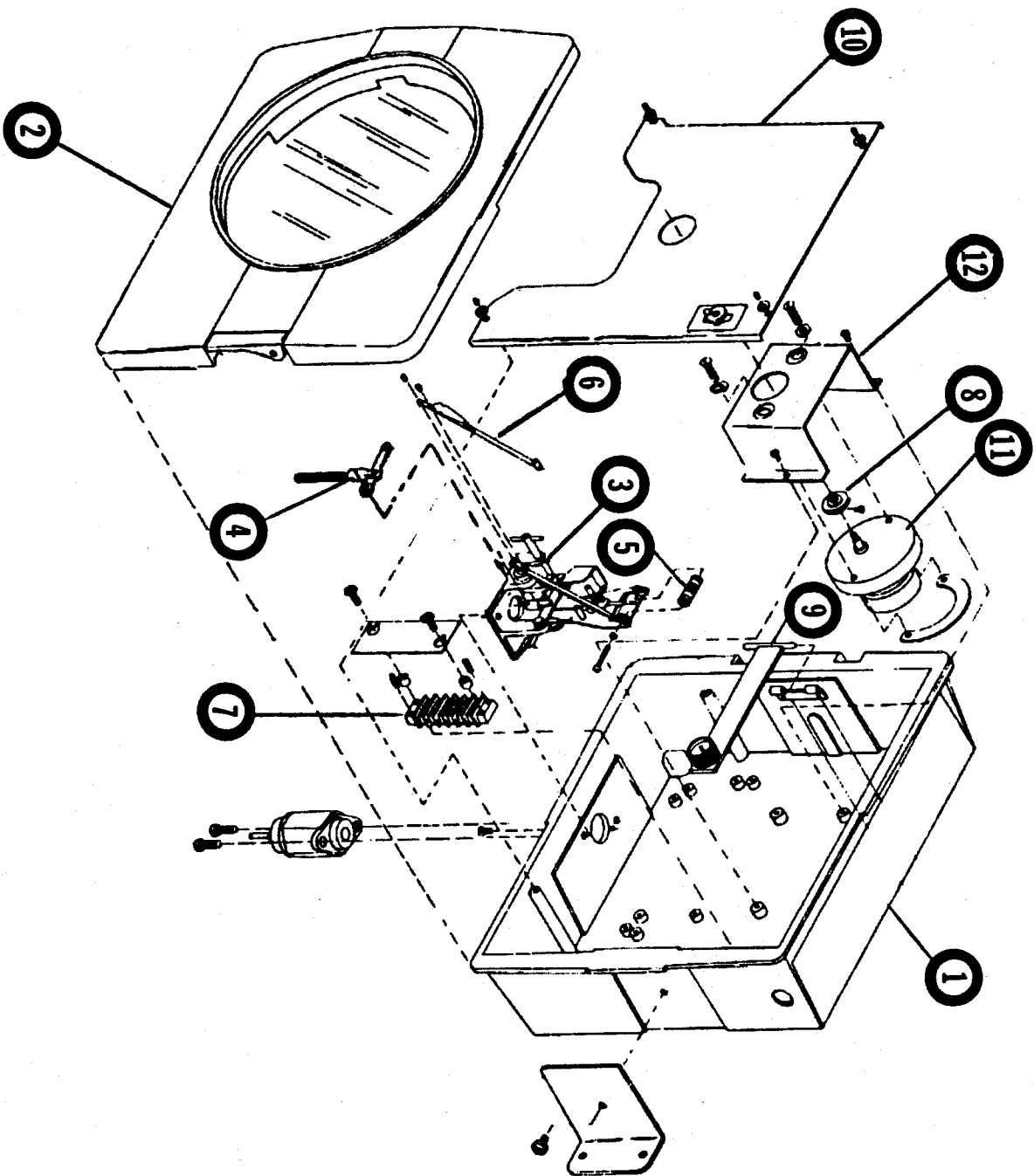
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For 9 Position
For 12 Position
For 14 Position

64415003
64415004
64415005



hours, transportation charges prepaid and which upon examination by Partlow are found not to comply with the above warranties. PARTLOW SHALL NOT BE LIABLE FOR ANY INCIDENTAL DAMAGES, SPECIAL DAMAGES, OR ANY OTHER DAMAGES, COSTS OR EXPENSES, EXCEPTING ONLY THE COST OR EXPENSE OF REPAIR OR REPLACEMENT AS ABOVE DESCRIBED. THERE ARE NO EXPRESSED OR IMPLIED WARRANTIES WHICH EXTEND BEYOND THE WARRANTIES HEREIN ABOVE SET FORTH. PARTLOW MAKES NO WARRANTY OR MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE PRODUCTS.

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