

DUAL SWITCH INDICATING MECHANICAL TEMPERATURE CONTROLLER

The LF15-79 is a dual switch indicating controller which operates in a fixed relationship to the temperature setting. Differential between switches can be adjusted up to 5 % of element range. It derives its simplicity and efficiency from the Piston-Pak filled system sensing element.



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SPECIFICATIONS INSTALLATION OPERATION

LF15-79

Partlow

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QUALITY INSTRUMENTATION DESIGNED & MANUFACTURED IN THE USA

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1675 Delany Rd.
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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.

LF15-79 PRODUCT SPECIFICATIONS

Dimensions	8 5/8" x 8" x 4 9/32" D
Panel Mount Cutout	7 inches wide by 7 3/4 inches high;
Surface Mounting	Mounting brackets included
Switch Type	Two 3- wire single pole double throw.
Switch Sensitivities	Normal 1% of range (#79 Switch) Super Sensitive 1/2% of element range (#73 Switch - Optional)
Switch Differential (Between each Switch)	0 to 5% of element range
Electrical Connection	Terminal block accessible through top cover hatch
Conduit Openings	1/2 inch NPS holes 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 opening location.
Electrical Rating	50VA, inductive; 500VA, non inductive; 250V maximum AC only.
Agency Approvals	UL and CSA Approved
Warranty	One year, details on the last page
Approx. Net Weight*	5 lbs
Approx. Ship. Weight*	8 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.

LF15-79 ORDER MATRIX



LF15-79*
(Requires L-Type element piunger).

ACCESSORIES

- 0 None
- 1 201 Weather Resistant **

* The first switch is always a #15. The standard second switch on the LF15-79 is a #79 which offers an accuracy of 1% of span. Accuracy of 0.5% of span may be achieved by specifying a #73 switch. However, a #73 switch must be ordered separately and will be shipped separately. User must remove the factory standard #79 switch and install the #73 switch. (See SWITCH REPLACEMENT section in this document). To order the #73 switch specify part #64403018.

** Requires an inverted dial scale. Check factory on availability.

PISTON-PAK THERMAL SENSING ELEMENT

A Piston-Pak Thermal Sensing Element must be specified for each LF15-79. Use Partlow Form Number 3028 "Mechanical Products Cross Reference and Pricing Guide" to configure the matrix number for the sensing element.

INSTALLATION AND WIRING

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 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 combinations. Note: Holes in brackets supplied are 9/32 clearance holes for 1/4" bolts. The three holes called out in the drawing may be any size that will accommodate the fastening required, (ie 9/32 for 1/4" thru-bolt with nut fastener) 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 three surface mounting angle brackets from the instrument. Figure 1A illustrates panel cut out dimensions. Cut the panel opening to 7" wide by 7 3/4" high. Drill 9/32 clearance holes in four locations if 1/4" thru-bolt with nut installation is desired. Should a tapped hole be more preferred, drill a #7 hole in four locations for a 1/4" x 20 NC or a #3 drill hole in four locations for a 1/4" x 28 NF.

Note: All configurations require a flat head screw for proper cover installation. With the instrument in the upright position, insert it and the element into the panel opening and tilt it 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 connections using short sections of flexible cable or conduit.** It is recommended that the rear conduit hole be used for panel mount installations. A drill guide hole is spotted in the back of the case to accommodate field drilling. Refer to the wiring diagram in Figure 2, page 4 and proceed. Withdraw screws H (Figure 3, page 4) and remove the cover hatch. This will allow access to the wiring connection terminal block. The terminal block is labeled H1, C1, L1, H2, C2, and L2. The letters H, C and L represent the normally open, common and normally closed sides, respectively, of the switches. Note that when temperature is below switch setpoint a circuit is made between L and C terminals. Make wiring connection according to Figure 2 (page 4) and replace the top cover hatch.

Figure 1 - Surface Mount Dimensions

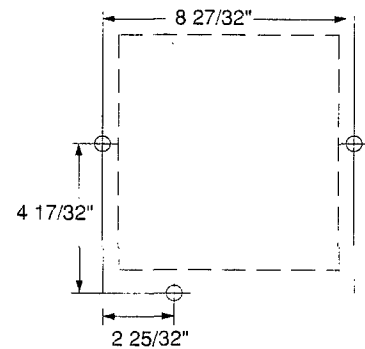
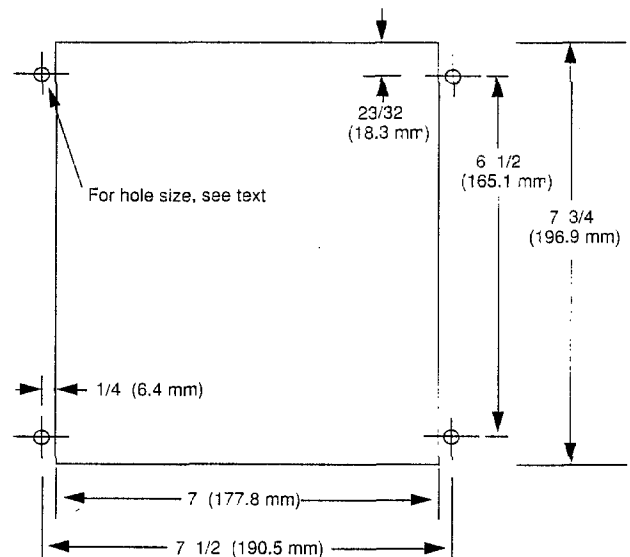


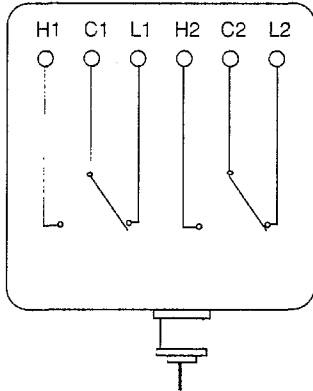
Figure 1A - Panel Cutout Illustration (in inches)



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 certain that the entire element is immersed in process). 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. If the bulb is to be subjected to corrosive or scouring conditions, it should be protected by a thermal well, separable socket or other protected material. These bulbs may be elevated up to 40 feet above the instrument without affecting calibration.

Figure 2 - Control Switch



STUFFING BOX INSTALLATION (IF APPLICABLE)

Overtightening of 21-T-105 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 130 to 180 inch-pounds for stainless steel.

INSTRUMENT OPERATION

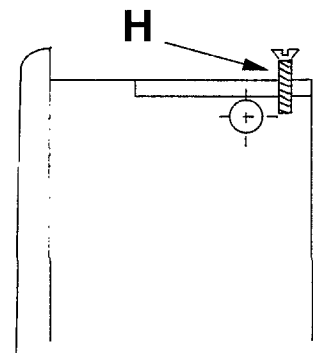
Prior to putting the instrument into service, check it against an accurate test thermometer. As with any precision instrument minor adjustments may be necessary after shipment and installation. If you are unfamiliar with how to perform this check refer to the CHECKING TEMPERATURE and RE-ZEROING of this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

Control temperature is established by turning the knob on the front of the instrument and moving the set pointer along the scale to the desired temperature. This positions the instrument's two snap acting switches. Both switches are spring loaded to the set pointer and are set in fixed relationship to the set point.

Switches are actuated by the same temperature responsive mechanism that moves the indicating pointer. The first switch to be actuated on a rise must always be Switch 1 (front leaf type). Second is Switch 2 (rear, pin-type), actuated only when the temperature exceeds the operation point of the first switch.

Switches are mounted one behind the other, each having its own circuit. Differential between the two switches may be adjusted from 0 to 5% of sensing element range by turning the set screws inside the instrument case (see Differential Adjustment).

Figure 3 - Cover Hatch Removal



MAINTAINING YOUR LF15-79

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 LF15-79. Turn the knob on the LF15-79 to the desired process temperature. Wait for the temperature to stabilize, then compare the test thermometer reading with that of the LF15-79. If the two readings do not agree, the LF15-79 should be re-zeroed.

RE-ZEROING YOUR LF15-79

Be sure that the process temperature is stable. Note the amount of temperature difference between the test thermometer reading and the black indicating pointer reading. Remove the instrument knob and cover. Note hex shaft J and set screws (Figure 4, page 5). Zeroing is accomplished by turning shaft J with the wrench provided. Lengthening shaft J (counterclockwise) raises the black indicating pointer reading; shortening shaft J (clockwise) lowers the reading. Shut off the power to the instrument and turn set pointer (reinstall knob on setting

shaft) to high end of scale; then turn shaft J accordingly and correct the reading of the black indicating pointer the same number of degrees as was found to be the error (difference) noted. Re-tighten screw S. Return set pointer to original setting and restore power to instrument. After temperature stabilization, black indicating pointer reading should agree with test thermometer reading. If necessary, repeat above procedure until properly zeroed. Replace cover and knob.

Note: *Power shut down described above prevents process temperature from building while adjustments are being made. If, however, the situation exists where power shutdown is not feasible, follow the same procedures but make shaft J adjustments as quickly as possible. In systems where temperature builds very rapidly, zeroing procedures may have to be repeated several times.*

SWITCH REPLACEMENT

#15 Micro Switch (Leaf Switch) Replacement (see Figure 10 for more details)

Turn the power to the LF15-79 off. Remove the cover and dial scale (see Exploded View Illustration on Page 8). Remove the two switch mounting screws from the front switch. (Note: the #15 switch has a spring leg actuator attached to it). Transfer the switch wires from the existing switch to the replacement switch one wire change at a time to avoid wiring confusion. Reattach the replacement switch to the switch bracket with the two mounting screws. Note the routing of the switch wires, be sure they do not interfere with proper switch actuation. Be sure to check switch actuation and adjust screw E2 (see Figure 5) as needed for proper control switch actuation.

#73 or #79 Micro Switch (Pin Type) Replacement

Turn the power off to the instrument. Remove the cover and dial scale (see Exploded view on page 8). Remove the two switch mounting screws from mechanism (page 7, see figure 10 for more details). One switch mounting screw will be part of the lower mounting screw from the front #15 switch. The second switch mounting screw will be below the first and it will be set back on the mechanism. Remove the switch from the bracket. Remove the wires from the original switch and transfer them one at a time to the replacement switch. Re-install the new switch and the mounting screws. Note the routing of the switch wires, be sure that they do not interfere with proper switch actuation. Be sure to check switch actuation and adjust screw E1 (see Figure 5) as needed for proper control switch actuation.

Note: *After replacing either switch it may be necessary to make an adjustment to the switch actuation screws E (Figure 5). If, during normal process temperature cycling, the indicating pen registers a constant differential over or under the red set pointer adjust the appropriate actuation screw E 1 or 2 to correct. Lengthening the screw lowers the temperature while shortening it raises the temperature. Note: there are two adjusting screws, the one closest to the cover is #15 adjustment and the one behind it is the #73 or #79 adjustment screw.*

SWITCH DIFFERENTIAL ADJUSTMENT

Screw Switch actuation E1 and E2 are adjusted at the factory such that the #15 switch (Front switch with switch leaf) actuates before setpoint (approximately 1% of span temperature). As the temperature continues to rise, the second switch #73 or #79 will actuate at setpoint. The actuation of the first switch and/or the actuation of the second may be adjusted either upscale or downscale with the E1 and E2 switch actuators. Note that whatever switch adjustments are desired, the front #15 switch should always actuate first before the rear #73 or #79 does. The maximum second switch actuation point should not be more than 5% of scale. Adjusting the E2 screw will cause the #15 switch to be moved either further below, or closer to setpoint. Rotating the screw CW will cause the switch to actuate closer to setpoint. Rotating the screw CCW will cause the switch to actuate further below setpoint. Adjusting E1 CW will cause the rear switch, either #73 or #79, to be moved further above setpoint. Adjusting E1 CCW will cause the rear switch to be moved below setpoint. Note, wherever switch actuators are eventually positioned, the differential between each switch should not exceed 5% of span, nor should the rear switch actuate before the front switch.

Figure 4 - Re-Zeroing

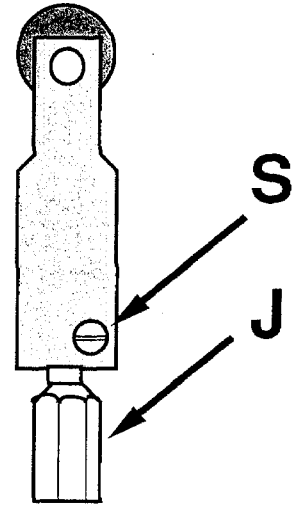
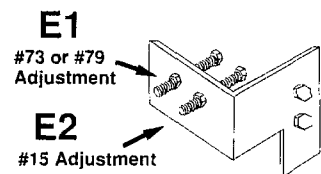


Figure 5 - Switch Replacement



BRAKE TIGHTENING

With use, the setting shaft brake may require tightening. If the brake is too loose, over travel movement of the black indicating pointer will tend to drag the red set pointer upscale from its set position. To tighten the brake, turn the adjusting screw U (Figure 6) clockwise. Check screw U adjustment by positioning the red set pointer to a low scale setting; then, with thumb placed at the base of the black indicating pointer arm, simulate over-travel by moving the black pointer upscale through and beyond the red pointer setting and repeat several times. If the set pointer moves noticeably from its set position screw U is not tight enough. If over-tightened, the set pointer will stay in position, but the setting knob will be very difficult to turn. Brake adjustment screw U should be tightened so that the red pointer retains its set position when over-traveled by indicating pointer, and setting knob turns with relative ease.

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 7) 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 LF15-79 and requires its own matrix number. To determine the correct sensing element configuration for your instruments and application see Partlow Form 3028 "Mechanical Products Cross Reference and Pricing Guide."

ELEMENT REPLACEMENT

To change a thermal sensing element start by removing screws D (Figure 8) and withdrawing the element from the instrument body. Then remove the element bulb from the medium. Install the new element and tighten screws D. Insert the new element bulb into the medium being measured. Note: After the element has been replaced check the temperature setting as re-zeroing may be necessary. If so see the CHECKING TEMPERATURE section.

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 CRC 2-26, 3-36, or 5-56. Use only CRC 2-26, 3-36, or 5-56 as other lubricants may cause build up and sticking of internal parts. CRC 2-26 may be purchased from Partlow in a 15 oz. container (part #63600401). CRC 5-56 may be purchased locally from any hardware or automotive store.

Figure 6 - Brake Tightening

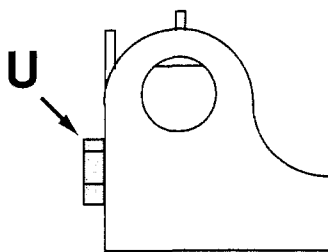


Figure 7 - Sensing Element ID

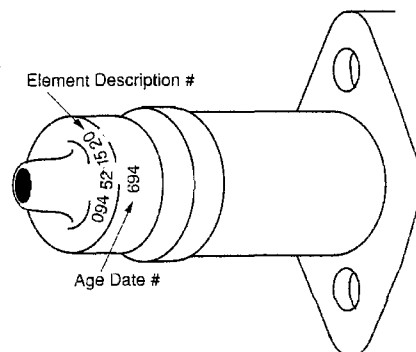
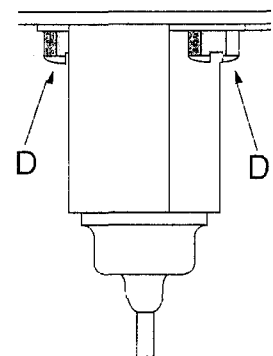


Figure 8 - Replacing Element



DIMENSIONAL DRAWING

Figure 9 - Dimensional Drawing

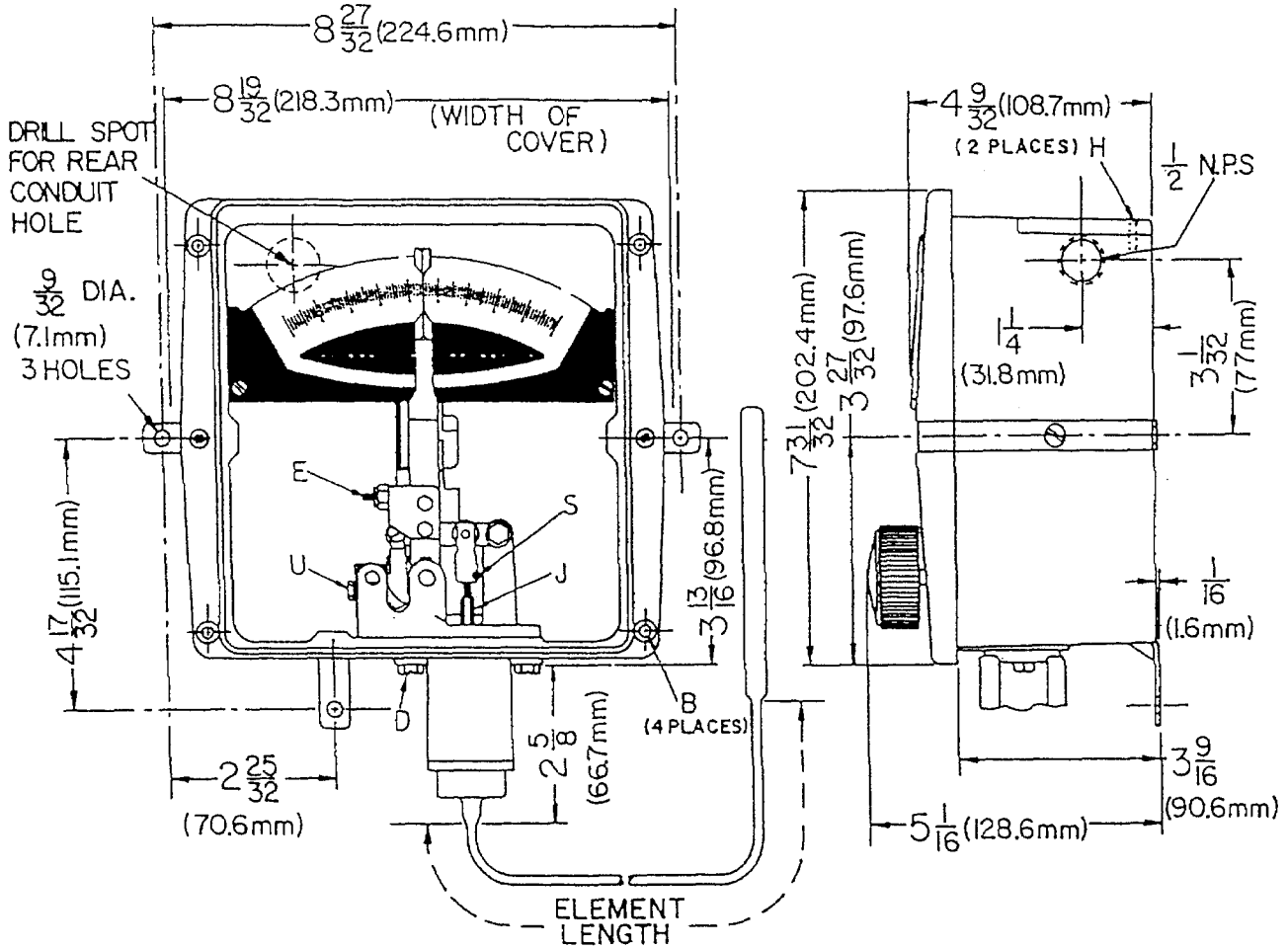
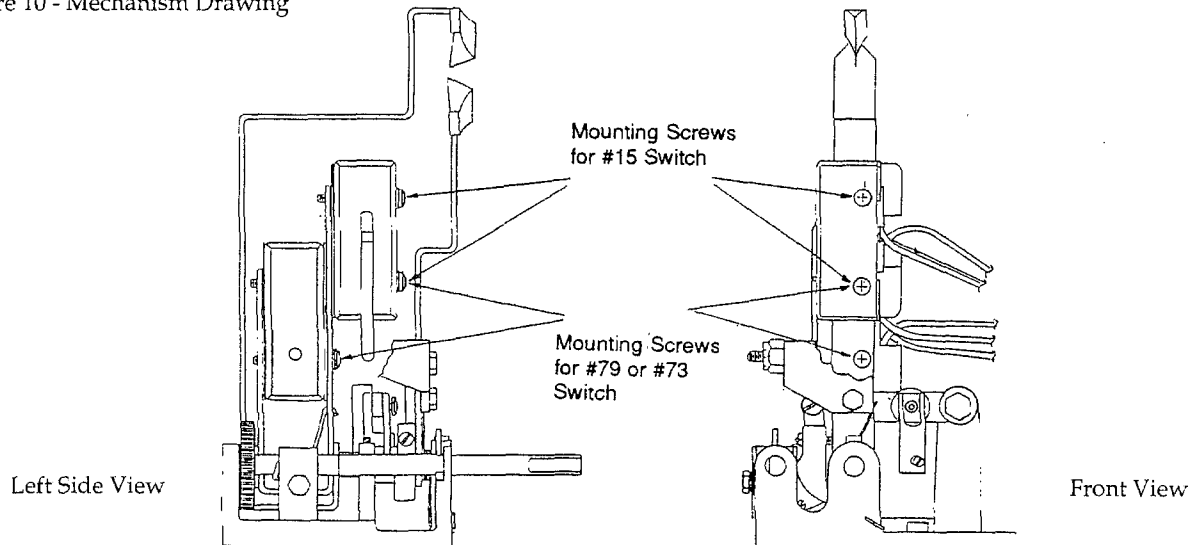


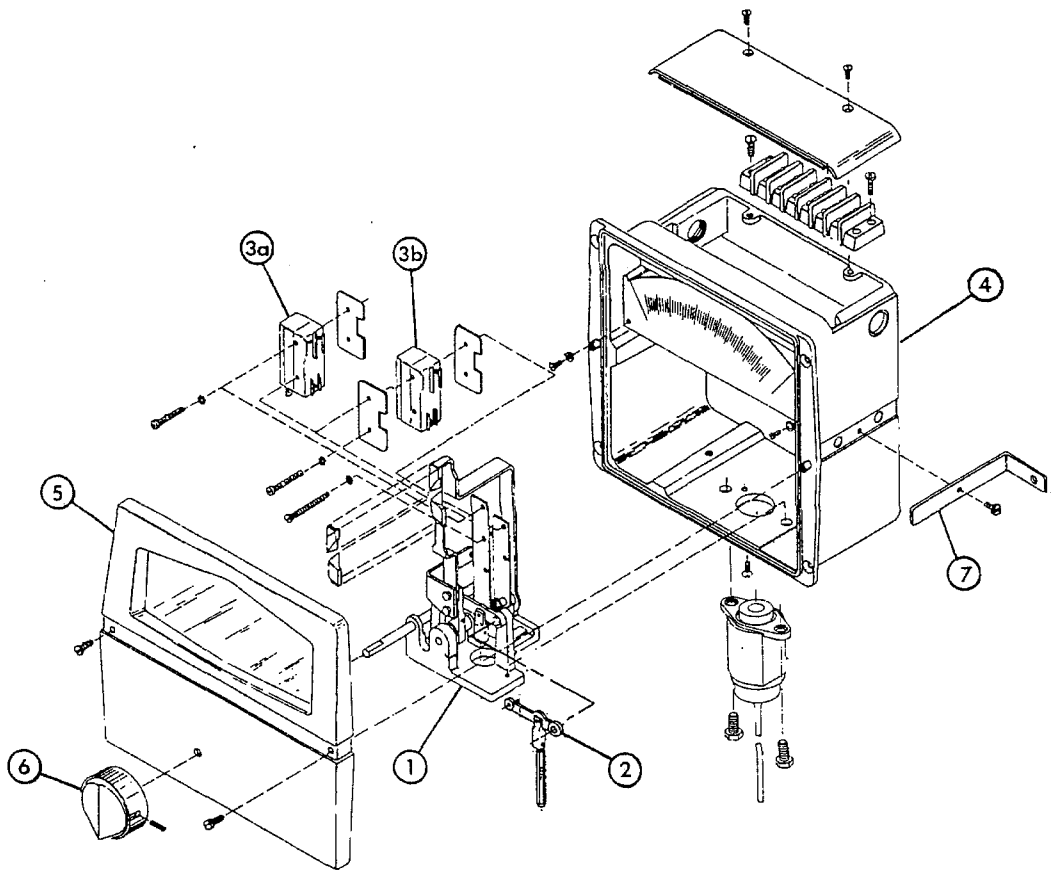
Figure 10 - Mechanism Drawing



Exploded Illustration and Parts List

- 1. Mechanism Assembly** 10072114
Includes: Switches #15 and #79, Wiring & Terminal Block With Mounting Screws, Push Rod.
 - 2. Main Lever Assembly** 64412001
Includes: Main Lever with Push Rod Cap, Push Rod, Set Screw.
 - 3. Micro Switches**
#15 Micro Switch 64403008
#79 Micro Switch 64403021
- Both include terminal screws
- Note: #79 replaces #4 switch
- 4. Case Assembly** 64412101
Includes: Top Plate With Screws, Terminal Block Barrier, Mounting Brackets With Screws

- 5. Cover Assembly** 64412201
Cover, Glass & Cover Screws
- 6. Knob Assembly** 10041301
Knob With Set Screw
- 7. Mounting Brackets (3 required)** 64402003
Brackets As Illustrated, sold separately
- 8. Standard Hardware Kit (not shown)** 64412701
Includes: Cover Screws, Switch Screws, Dia. Screws, Terminal Block Mounting Screws, Mechanism Holding Screws, Mounting Bracket Screws, Push Rod Set Screw, Top Plate Screw, Ground Screw



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 to that same time to the specifications set forth in the relevant Partlow instrumentation sheet, sheets, manual or manuals for such products.

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