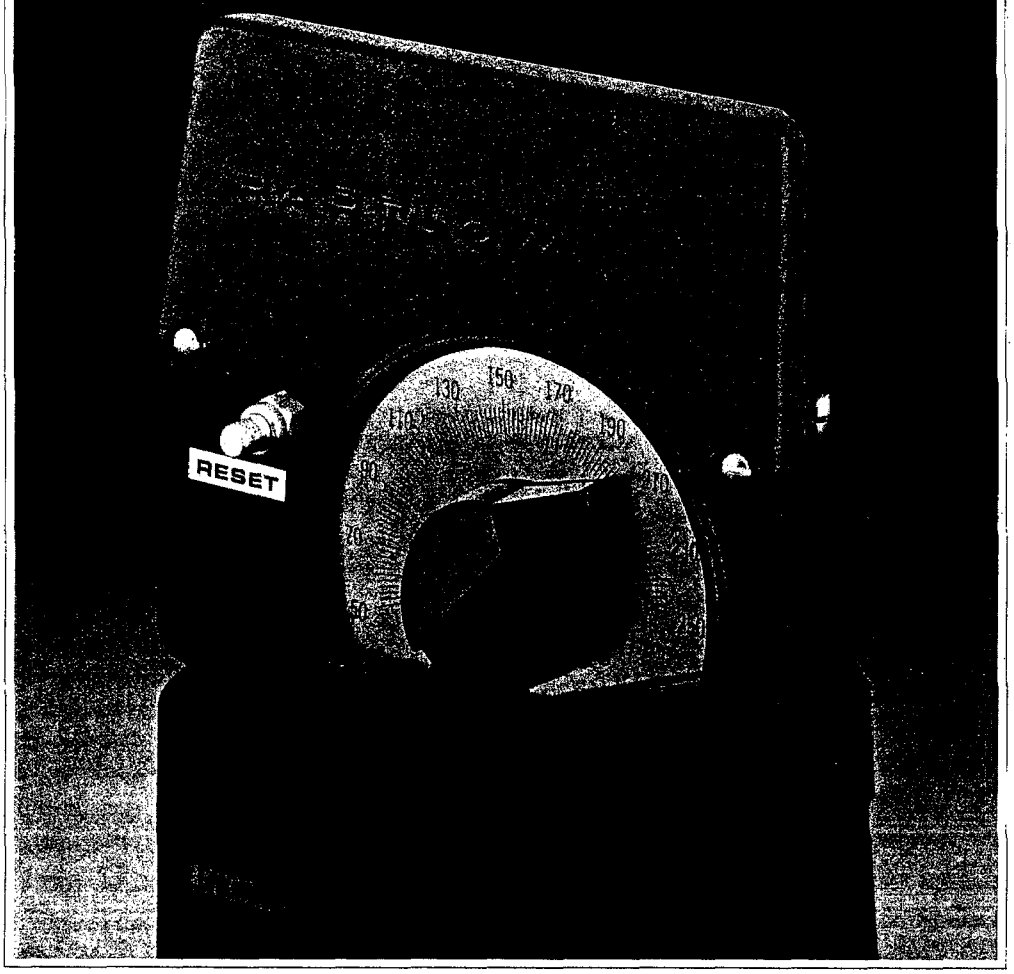
NON-INDICATING HIGH TEMPERATURE LIMIT DEVICE

The ZFHL is a non-indicating temperature limit device used in conjunction with a primary temperature controller to disconnect circuitry if pre-set temperature is exceeded. The instrument is tamperproof by use of a clear acrylic dial and knob shield held in place by capstan cover screws which may be wire-tie sealed. It derives its simplicity and efficiency from the Piston-Pak filled systems sensing element.



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First Edition

SPECIFICATIONS
INSTALLATION
OPERATION

ZFHL

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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:

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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.

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

ZFHL PRODUCT SPECIFICATIONS

Dimensions	5 7/8" W X 5 7/16" H X 4 1/8" D
Mounting Type	Surface or Panel
Panel Mount Cutout	4 3/4" W X 5" H
Electrical Rating	15 amps, 125 or 250 VAC only
Number of Switches	One, high limit safety switch manually-resetable
Electrical Connections	Thru terminal block located in side of instrument.
Conduit Opening	7/8" diameter opening in top of case for electrical fitting; drill-guide hole spotted in rear of case for optional rear entrance
Agency Approvals	FM
Approx. Net Weight*	5 lbs.
Approx. Ship. Weight*	8 lbs.

* Weight may vary depending on length of element.

ZFHL ORDER MATRIX

	Order Number
ZFHL*	**ZF00061**

* An L-type plunger is required.

Specify dial scale required.

PISTON PAK THERMAL SENSING ELEMENT
A Piston Pak Thermal Sensing Element must be specified for each ZFHL. Use Partlow Form 3028 "Mechanical Product Instrumentation Cross Reference and Pricing Guide" to configure the matrix number for the sensing element.

INSTALLATION AND WIRING

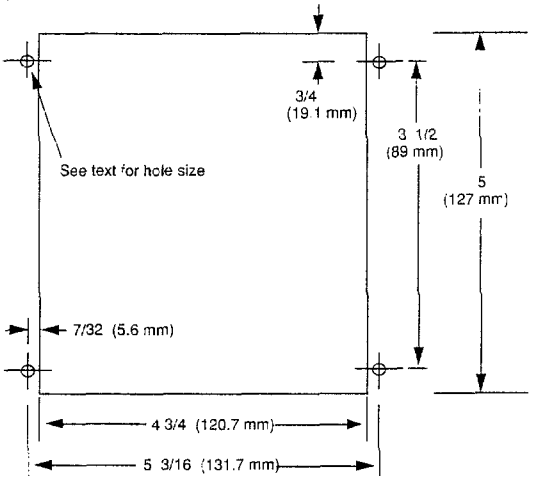
LOCATION

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) may be surface or flush mounted. For flush mounting refer to Figure 1 for cutout dimensions. Figure 1 illustrates hole placement for mounting in four places. Holes may be sized to accomodate the fastener 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 (Fastener must be flat head for proper cover clearance). The instrument may also be surface mounted. See Figure 1A for hole placement, mounting hole requirements are same as above in four places.

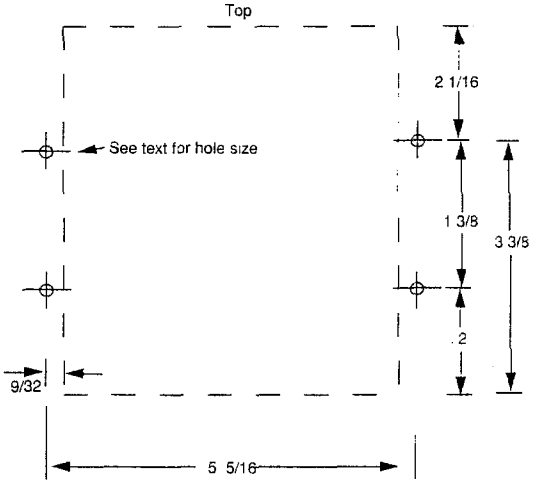
Figure 1 - Panel Cutout illustration (in inches)



WIRING

The top conduit hole should be used to make all electrical connections. An optional rear hole may be used if drilled out. It is spotted on rear of case, see Figure 7 (page 6). Make necessary electrical connections using short sections of flexible cable or conduit according to applicable electrical codes, ordinances and regulations regarding the use of conduit, etc. Next, access the connection terminal block by removing the front acrylic tamper shield, setting knob and instrument cover. The terminal block is labeled H, C and L (See Figure 2, below). H represents normally-open, C common and L normally closed. Make your necessary electrical connections using Figure 2 as a guide. Re-install cover, knob and shield after wiring instrument.

Figure 1A - Surface Mount Illustration



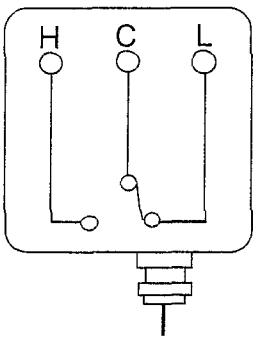
PLACING THE THERMAL SENSING ELEMENT

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 your local Partlow Representative, Distributor or the Factory.

STUFFING BOX INSTALLTION (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.

Figure 2 - Wiring



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.

The high limit switch is positioned to desired setting by turning the dial knob on the instrument cover - but only after the acrylic dial shield is removed by withdrawing the capstan cover screws.

Temperature changes at the sensing bulb positions mechanical linkage in the instrument to actuate the limit switches which open the circuit to the protected equipment and actuates the current for annunication of a tripped control, ie alarms, lights, etc. Only when the process temperature returns to below the dial setting can the switch be reset by pushing the reset button on the cover of the instrument.

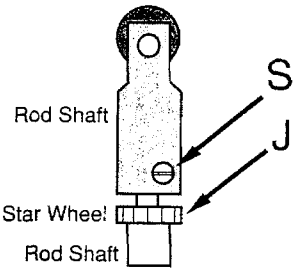
MAINTAINING YOUR ZFHL

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 ZFHL. Remove the acrylic shield then turn the knob on the instrument cover to the desired high limit setting. Allow adequate time for process temperature to stabilize. Slowly turn setting knob downscale until switch actuates (listen for switch clicks or note equipment shut-down or alarm signal, etc). Compare dial reading of instrument with test thermometer (process temperature). If dial reading does not agree with reading of test thermometer, the instrument should be re-zeroed.

Note: Checking temperature should be performed on a regular basis (approx. once a month) to make sure limit circuit is functioning properly.

Figure 3 - Re-Zeroing



RE-ZEROING YOUR ZFHL

Be sure that the process temperature is stable. Remove acrylic shield from instrument front , turn knob to agree with the test thermometer reading. Without disrupting dial setting, remove dial knob along with front cover. Instrument zeroing is accomplished by loosening set screw S and turning push rod pinion gear J with tip of screwdriver. If switch did not actuate when test thermometer agreed with dial setting: loosen screw S and slowly turn pinion gear to the left (counter clockwise) until swtich does actuate. Re-tighten set screw S after setting. If switch did actuate when test thermometer agreed with dial setting; loosen set screw S and slowly turn pinion gear J to the right (clockwise) until actuating arm breaks contact with the switch-pin; then push reset lever with finger to reset switch. Next slowly turn pinion gear back to the left (counter clockwise) until switch just actuates. Retighten set screw S.

Replace instrument cover and carefully reinstall knob or shaft at it's original setting. Check zeroing adjustment: turn setting knob upscale, press reset button, and slowly turn knob back downscale until switch actuates. Dial reading should now agree with test thermometer. If not repeat zero procedure. Once set, turn knob to desired high-limit setting and replace acrylic shield.

SWITCH REPLACEMENT

Turn the off power to the ZFHL. Remove the capstan screws and tamper proof shield. Loosen the set screw for the knob and remove it and the cover exposing the inner mechanism. Remove the two screws holding the switch to the switch arm. Use care and attention to the location and orientation of the insulators and switch reset assembly. Remove switch from bracket and remove wires to switch, note their location. Install wires onto replacement switch in proper locations. Re-assemble replacement switch into holding bracket. Be sure that insulation and reset assembly and wire-holder are properly positioned with respect to how they were removed. Replace cover and setting knob.

Note:After switch replacement it is a requirement that switch actuation point be checked for proper temperature actuation.

See CHECKING TEMPERATURE adjustments to verify.

BRAKE TIGHTENING

Periodically, the setting shaft brake may require tightening. If the setting knob turns too freely, tighten the brake by turning the hex head screw U clockwise (Figure 4, below), be careful not to overtighten.

PISTON-PAK THERMAL 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 5, 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 ZFHL and requires its own matrix number. To determine the correct sensing element configuration for your instrument(s) and application, see Partlow Form 2787 "Piston Pak Element Order Matrix and Price List".

ELEMENT REPLACEMENT

To change a thermal sensing element, start by removing screws D (Figure 6, 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.

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

Caution: The inside mechanism(s), particulary 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 4 - Brake Tightening

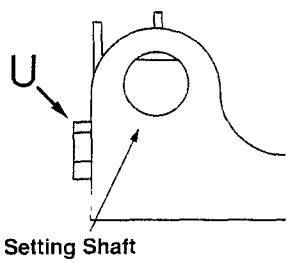


Figure 5 - Sensing Element ID

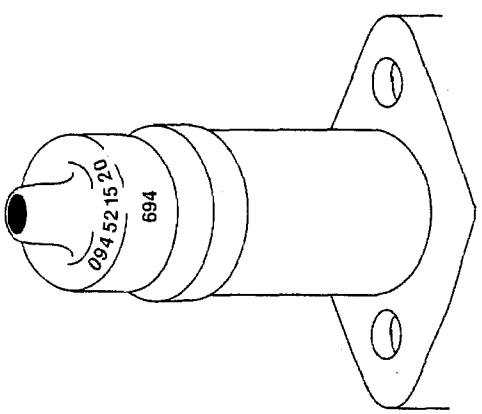
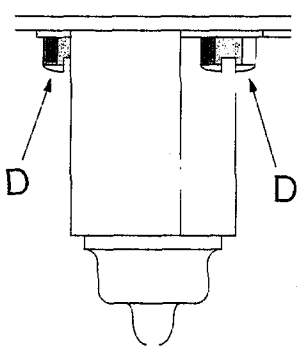


Figure 6 - Replacing Element



DIMENSIONAL DRAWING

Figure 7 - Dimensional Drawing

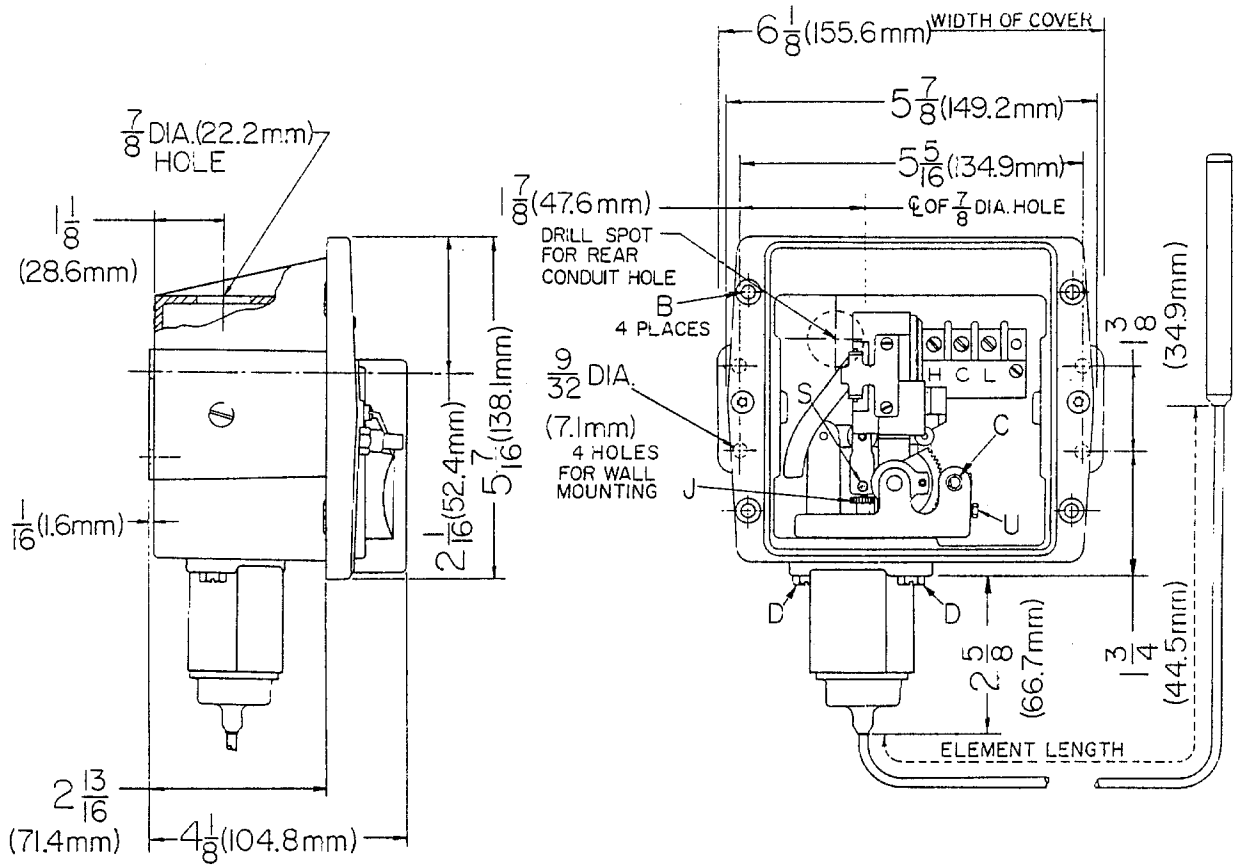
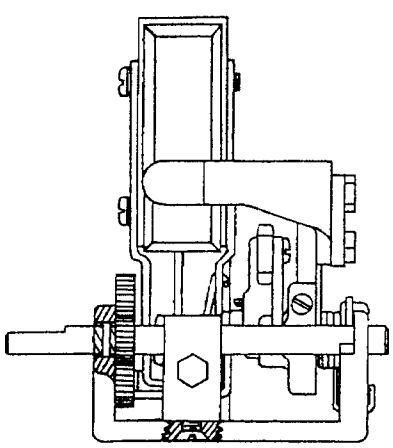
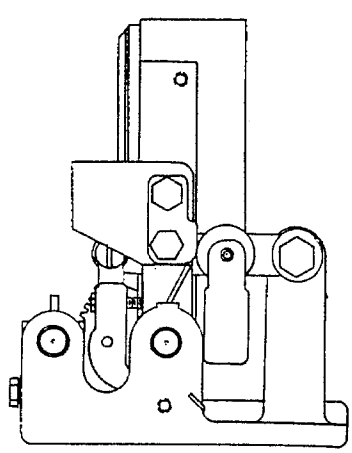


Figure 8 - Mechanism Drawing



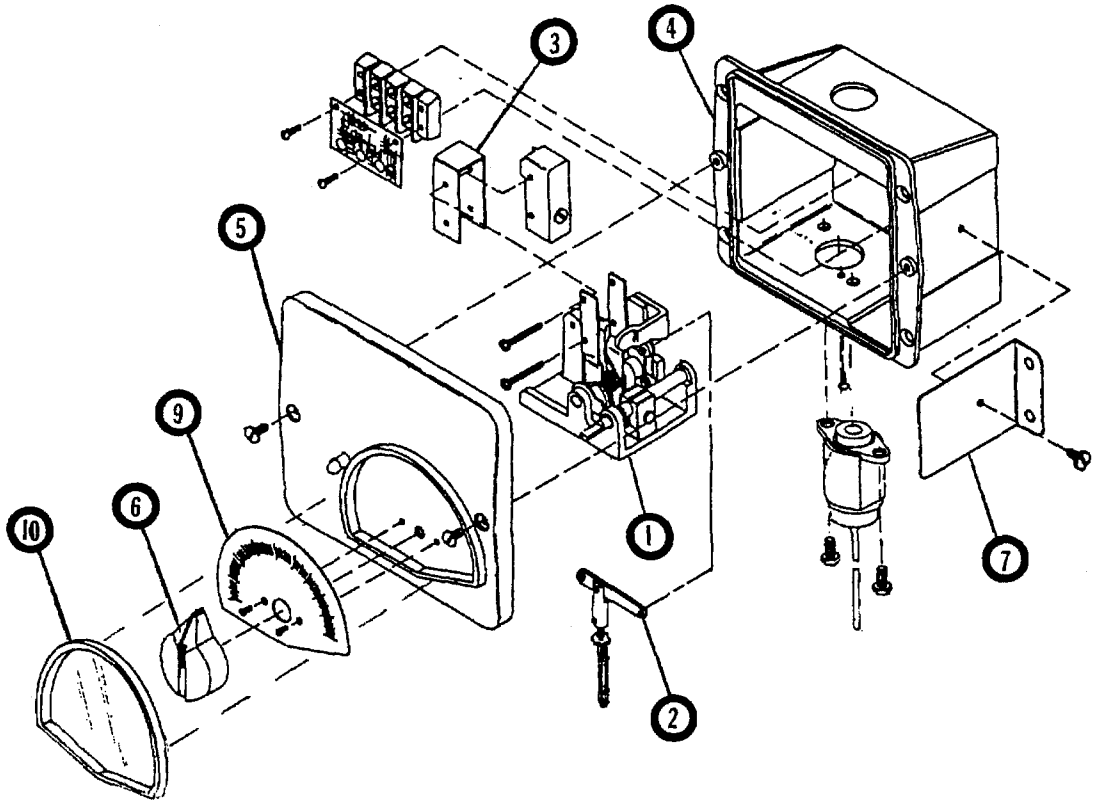
Left Side View



Front View

EXPLODED ILLUSTRATION AND PARTS LIST

1. Mechanism Assembly includes: Micro Switch, Wiring and Terminal Block, Push Rod.	**10076401**
2. Main Lever Assembly Includes: Main Lever with Push Rod Cap, Push Rod, Set Screw.	**64412301**
3. Micro Switch Includes: Terminal Screws	**64403006**
4. Case Assembly Includes: Mounting Brackets	**64412401**
5. Cover Assembly Includes: Dial Screws, Cover Screws and Dial Scale. When ordering specify Dial range and if Standard or Inverted Mount.	**SP10093501**
6. Knob Assembly Includes: Set Screw	**ZFS7**
7. Mounting Brackets Consult factory for re-order.	**64402002**
8. Standard Hardware Kit (not shown) includes: Cover Screws (2) Switch Screws (2) Dial Screws (2) Terminal Block Screws-9/16 (2) Terminal Block Screws-1/2 (2) Mechanism Holding Screw (1) Mounting Bracket Screws (2) Ground Screw (1)	**64412501**
9. Dial Scale **Specify Range and Standard or Inverted Mount**	
10. Cover Shield	**ZFHL5**



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.

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