



## 117 Series Temperature Switch

Types B117, E117



UNITED ELECTRIC CONTROLS

### Installation and Maintenance Instructions

Please read all instructional literature carefully and thoroughly before starting. Refer to the final page for the listing of Recommended Practices, Liabilities and Warranties.

#### GENERAL

##### Types B117 (Immersion Stem)

Temperature variations are sensed by a liquid filled sensor which expands or contracts against a bellows, in turn actuating or deactuating a snap-action switch at a predetermined set point. Set point is adjusted by turning an internal dial.

##### Types E117 (Bulb & Capillary)

Temperature variations of a liquid filled sensing bulb are hydraulically transmitted to a bellows which either actuates or deactuates a snap-action switch at a predetermined set point. Set points are adjusted by turning an internal dial.

## Part I - Installation

#### Tools Needed

Adjustable Wrench

Screwdriver

Hammer (for alternate wire knockouts)



THIS EQUIPMENT IS SUITABLE FOR USE IN CLASS I, DIVISION 2, GROUPS A, B, C, AND D OR NON-HAZARDOUS LOCATIONS ONLY.

#### MOUNTING



INSTALL UNIT WHERE SHOCK, VIBRATION AND TEMPERATURE FLUCTUATIONS ARE MINIMAL. ORIENT UNIT SO THAT MOISTURE IS PREVENTED FROM ENTERING THE ENCLOSURE. DO NOT MOUNT UNIT IN AMBIENT TEMPERATURES EXCEEDING PUBLISHED LIMITS.

117 Series Temperature Controls can be mounted in any position, provided the electrical conduit is **not** facing up. Mount the unit via the (2) 1/4" screw clearance holes on the enclosure (See Mounting Dimensions on page 3).



ALWAYS HOLD A WRENCH ON THE TEMPERATURE HOUSING HEX WHEN MOUNTING UNIT. DO NOT TIGHTEN BY TURNING ENCLOSURE. THIS WILL DAMAGE SENSOR AND WEAKEN SOLDERED OR WELDED JOINTS.

For remote mounting, fully immerse the bulb and 6" capillary in the control zone. For best control it is generally desirable to place the bulb close to the heating or cooling source in order to sense temperature fluctuations quickly. Be sure to locate the bulb so it will not be exposed to temperature beyond the instrument range limits.

#### WIRING



DISCONNECT ALL SUPPLY CIRCUITS BEFORE WIRING



ELECTRICAL RATINGS STATED IN LITERATURE AND ON NAMEPLATE SHOULD NEVER BE EXCEEDED. OVERLOAD ON A SWITCH CAN CAUSE FAILURE ON THE FIRST CYCLE.



WIRE UNITS ACCORDING TO NATIONAL AND LOCAL ELECTRICAL CODES. MAXIMUM RECOMMENDED WIRE SIZE IS 14 AWG.

Remove the two screws retaining the cover and cover gasket. Two cast-in 7/8" diameter knock outs for electrical conduits are located on the side and back of enclosure. These can easily be knocked out by placing a blade of a screwdriver in groove and tapping sharply with a hammer. A 1/2" NPT conduit connection is also provided on the left hand side of the enclosure. The terminal block terminals are clearly labeled "Common", "Normally Open" and "Normally Closed." For units supplied with DPDT, the following color coding applies.

	SPDT	DPDT	
		SWT1	SWT2
Common	Violet	Violet	Yellow
Normally Closed	Black	Black	Red
Normally Closed	Blue	Blue	Orange

Grounding screw and clamp (cast in symbol) are provided. Keep the wire as short as possible to prevent interference with the plunger and switch lever.

## Part II - Adjustments

### Tools Needed



ALL MODELS HAVE A TWO-PIECE ADJUSTABLE PLUNGER. THIS FEATURE IS CHARACTERIZED BY A 3/16" HEX HEAD SCREW INSTALLED IN THE 1/4" HEX PLUNGER. THE LENGTH OF THIS ASSEMBLY IS ADJUSTED AT OUR FACTORY AND IS CRITICAL TO THE FUNCTION OF THE CONTROL.



DURING NORMAL CALIBRATION, THIS ADJUSTMENT SHOULD NOT BE DISTURBED. HOWEVER, WHEN REPLACING THE ELECTRICAL SWITCH, IT MAY BE NECESSARY TO ADJUST THE PLUNGER LENGTH IN ORDER TO "RE-GAP" THE SWITCH. REFER TO INSTRUCTIONS IN "PART III-REPLACEMENTS" TO DETERMINE IF RE-GAPPING IS NECESSARY.

**Types B117 and E117** with dial knob controls are factory calibrated for maximum accuracy at the midpoint of the scale.

**NOTE:** Dial knob can be locked at any set point using set screw. The set screw is located below the index pointer.

To re-calibrate, turn dial to desired set point. If the actual temperature and set point temperature do not agree, turn the 3/16" hex fine adjustment screw clockwise to raise and counter-clockwise to lower temperature setting.

## Part III - Replacements

### Tools Needed

Screwdriver



USE ONLY FACTORY AUTHORIZED REPLACEMENT PARTS AND PROCEDURES. COMPONENTS AVAILABLE FOR REPLACEMENT ARE THE THERMAL ASSEMBLIES AND ELECTRICAL SWITCHES. OTHER COMPONENTS FACTORY REPLACEABLE ONLY. DISCONNECT LIVE CIRCUITS BEFORE REMOVING THE COVER.



WARNING: EXPLOSION HAZARD - SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, DIVISION 2.



WARNING: EXPLOSION HAZARD - DO NOT DISCONNECT EQUIPMENT OR REPLACE COMPONENTS UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NON-HAZARDOUS.

The component most likely to require replacement is the switch. Replace parts according to the following procedures.



MAXIMUM TEMPERATURE IS THE HIGHEST TEMPERATURE TO WHICH A SENSING ELEMENT MAY BE OCCASIONALLY OPERATED WITHOUT ADVERSELY AFFECTING SET POINT CALIBRATION AND REPEATABILITY. MAXIMUM TEMPERATURE LIMITS STATED IN LITERATURE MUST NEVER BE EXCEEDED, EVEN BY SURGES IN THE SYSTEM. OCCASIONAL OPERATION OF UNIT UP TO MAXIMUM TEMPERATURE IS ACCEPTABLE (E.G. START-UP TESTING). CONTINUOUS OPERATION SHOULD BE RESTRICTED TO THE DESIGNATED ADJUSTABLE RANGE.

### REPLACEMENT OF SWITCHES

Switch replacement (all models). Specify control type and switch rating from nameplate.

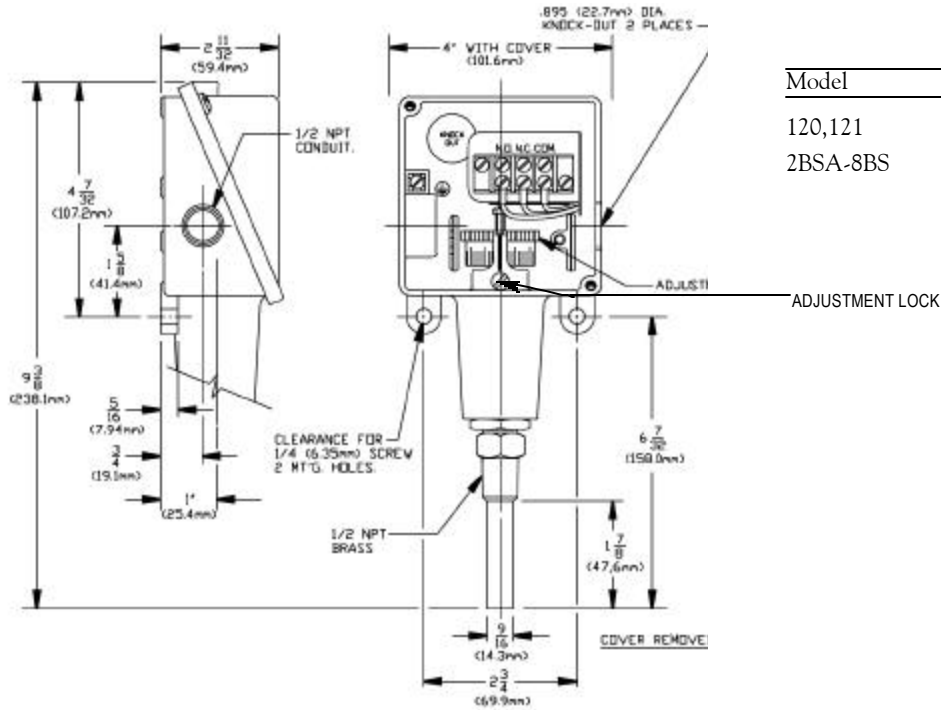
Disconnect live circuits before replacing the switch.



PRIOR TO DISASSEMBLY, REVIEW THE ORIENTATION OF THE SWITCH LEADWIRES AND THE POSITIONING OF THE SWITCH LEVER OVER THE PLUNGER.

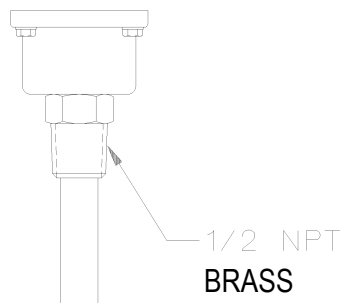
- 1) Disconnect leadwires from the terminal block.
- 2) Remove (2) terminal block mounting screws.
- 3) Remove the spacer and (2) switch mounting screws.
- 4) Replace new switch assembly. Make sure orientation of lever is the same as the original switch. Secure in place.
- 5) Reposition insulator underneath the terminal block and secure it to the spacer.
- 7) Check set point and re-calibrate per Part I.
- 8) Connect wires and replace cover securely.

## Dimensions

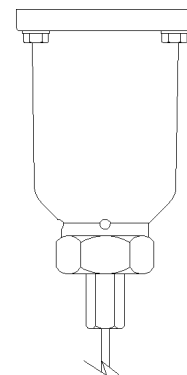


Model	Dimension A		
	Inches	mm	NPT
120,121	10.44	265,10	Immersion
2BSA-8BS	8.75	222,23	Bulb & Cappillary

## Temperature Sensors



**Models 120-121**



**Models 2BSA-8BS**

### RECOMMENDED PRACTICES AND WARNINGS

United Electric Controls Company recommends careful consideration of the following factors when specifying and installing UE pressure and temperature units. Before installing a unit, the Installation and Maintenance instructions provided with unit must be read and understood.

- To avoid damaging unit, proof pressure and max temperature limits stated in literature and on nameplates must never be exceeded, even by surges in the system. Operation of the unit up to proof pressure or max temperature is acceptable on a limited basis (i.e.start-up, testing) but continuous operation must be restricted to the designated adjustable range. Excessive cycling of pressure and temperature could reduce sensor life.
- A back-up unit is necessary for applications where damage to a primary unit could endanger life, limb or property. A high or low limit switch is necessary for applications where dangerous runaway condition could result.
- The adjustable range must be selected so that incorrect, inadvertent or malicious setting at any range point can not result in an unsafe system condition.
- Install unit where shock, vibration and ambient temperature fluctuations will not damage unit or affect operation. Orient unit so that moisture does not enter the enclosure via the electrical connection.
- Unit must not be altered or modified after shipment. Consult UE if modification is necessary.
- Monitor operation to observe warning signs of possible damage to unit, such as drift in set point. Check unit immediately.
- Preventative maintenance and periodic testing is necessary for critical applications where damage could endanger property or personnel.
- For all applications, a factory set unit should be tested before use.
- Electrical ratings stated in literature and on nameplate must not be exceeded. Overload on a switch can cause damage, even on the first cycle. Wire unit according to local and national electrical codes, using wire size recommended in installation sheet.
- Use only factory authorized replacement parts and procedures.
- Do not mount unit in ambient temp. exceeding published limits.
- For remote mounted temperature units, capillary lengths beyond 10 feet can increase chance of error, and may require re-calibration of set point and indication.

### LIMITED WARRANTY OF REPAIR AND REPLACEMENT

UE warrants that the product hereby purchased is, upon delivery, free from defects in material and workmanship and that any such product which is found to be defective in such workmanship or material will be repaired or replaced by UE (F.O.B. UE); provided, however, that this warranty applies only to equipment found to be so defective within a period of 12 months after installation by buyer but not to exceed 18 months after delivery by the seller. UE shall not be obligated under this warranty for alleged defects which examination discloses are due to tampering, misuse, neglect, improper storage, and in any case where products are disassembled by anyone other than authorized UE representatives.

EXCEPT FOR THE LIMITED WARRANTY OF REPAIR AND REPLACEMENT STATED ABOVE, UE DISCLAIMS ALL WARRANTIES WHATSOEVER WITH RESPECT TO THE PRODUCT, INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE.

### LIABILITY TO LIMITATION

SELLER'S LIABILITY TO BUYER FOR ANY LOSS OR CLAIM, INCLUDING LIABILITY INCURRED IN CONNECTION WITH (I) BREACH OF ANY WARRANTY WHATSOEVER EXPRESSED OR IMPLIED, (II) A BREACH OF CONTRACT, (III) A NEGLIGENT ACT OR ACTS (OR NEGLIGENT FAILURE TO ACT) COMMITTED BY SELLER, OR (IV) AN ACT FOR WHICH STRICT LIABILITY WILL BE IMPUTED TO SELLER, IS LIMITED TO THE LIMITED WARRANTY OF REPAIR AND REPLACEMENT STATED HEREIN. IN NO EVENT SHALL THE SELLER BE LIABLE FOR ANY SPECIAL, INDIRECT, CONSEQUENTIAL OR OTHER DAMAGES OF A LIKE GENERAL NATURE, INCLUDING, WITHOUT LIMITATION, LOSS OF PROFITS OR PRODUCTION, OR LOSS OR EXPENSES OF ANY NATURE INCURRED BY THE BUYER OR ANY THIRD PARTY.



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