

INDICATING TEMPERATURE CONTROLS AND THERMOMETERS



FEATURES

- Simple adjustment and control
- Rugged construction for demanding applications
- Improve efficiency with best-in-class repeatability
- Meet environment requirements with enclosure design options
- Match process requirements with an assortment of available ranges



OVERVIEW

For applications that require a visual display of process temperature and set point, the 800 Series offers a highly readable four inch setting/ indication scale. It is available in two versions: a Lexan® enclosure for enclosure type 1 or 4 applications (with option M300), and with Lexan® window and epoxy-coated aluminum enclosure for Div. 1 explosion proof applications. For temperature indication only, the T800 thermometer incorporates the same performance and construction features of the 800 Series.

800 Series models control and indicate the temperature of food service appliances, ovens, packaging machines, HVAC equipment, and various temperature applications within process plants.

FEATURES

- Temperature indication and control switching
- Single or dual SPDT output
- Stainless steel bulb & capillary
- Simple to adjust via external knob
- Explosion proof models are UL listed, cUL certified, and ATEX compliant
- Optional Russian, Ukrainian, and Chinese, flameproof or intrinsic safety compliance
- Optional thermowells and union connectors available



Lexan® is a registered trademark of
SABIC Innovative Plastics IP BV

SPECIFICATIONS

STORAGE TEMPERATURE	-65 to 160°F (-54 to 71°C)
AMBIENT TEMPERATURE LIMITS	-40 to 160°F (-40 to 71°C); set point typically shifts less than 1% of range for a 50°F (28°C) ambient temperature change
SET POINT REPEATABILITY	± 1% of adjustable range
SHOCK	Set point repeats after 15 G, 10 millisecond duration
VIBRATION	Set point repeats after 2.5 G, 5-500 Hz
ENCLOSURE	Types 800, 802: Lexan® black finish; clear Lexan® faceplate Types T800, 820E, 822E: Die cast aluminum, epoxy coated enclosure, gasketed; Lexan® cover and faceplate
ENCLOSURE CLASSIFICATION	Types 800, 802, T800: Designed to meet enclosure type 1 requirements (enclosure type 4 by specifying option M300). Types 820E, 822E: Designed to meet enclosure type 4X; Class I Div. 1 products meet enclosure type 7; Class II, Div. 1 products meet enclosure type 9. Certified to IP66 requirements
INDICATION ACCURACY	± 1% of adjustable range
SWITCH OUTPUT	One or two SPDT; dual switch may be separated up to 100% of range; except type 822E where switch #2 can be set up to 25% of range span below switch #1 set point. Switches may be wired "normally open" or "normally closed." NOT APPLICABLE TYPE T800.
DUAL SWITCH ADJUSTMENT	Type 802: Dual switch controls have separate knob & temperature pointers for each switch set point (standard); turn inner green knob for setting #1 switch; outer black knob for switch #2. Type 822E common adjustment single knob and pointer for set point
ELECTRICAL RATING	15 A 125/250/480 VAC resistive. Electrical switches have limited DC capabilities at 24-30 VDC, 2A resistive and 1A inductive. 125 VDC, 0.5A resistive, 0.03A inductive. Consult factory for additional information. DC ratings are not listed on nameplate. NOT APPLICABLE TYPE T800.
WEIGHT	Types 800, 802, T800: Approx. 3 lbs., 4 oz. (1,47 kg) Types 820E, 822E: Approx. 7 lbs (3,18 kg)
ELECTRICAL CONNECTION	Types 800, 802: 7/8" diameter knockout on left hand side; 18 AWG color-coded leadwires, approx. 9 inches exposed with strain relief (option M100 adds terminal block wiring). NOT APPLICABLE TYPE T800. Type 820E: two 3/4" NPT E/C with terminal block. Type 822E: one 3/4" NPT E/C with terminal block
BULB AND CAPILLARY	6 feet 304 stainless steel
TEMPERATURE FILL	Model 1BS: solvent filled; models 2-8: non-toxic oil filled
TEMPERATURE DEADBAND	Typically 1% of range under laboratory conditions (70°F ambient circulating bath at rate of 1/2°F per minute change)

APPROVALS

UE declarations and third-party issued Agency certifications are available for download at www.ueonline.com/prod_approval.



UNITED STATES AND CANADA

800 & 802 Models

UL Listed, cUL Certified

UL 873, file # E10667; CSA C22.2 No. 24

820E & 822E Models

Class I, Division 1 and 2, Groups B, C & D

Class II, Division 1 and 2, Groups E, F & G

Class III

Class I, Zone 1, Group IIB + H₂ T6

Enclosure Type 4X

UL Listed, cUL Certified

UL 1203 & 50; CSA No. 25 & 30 - file # E43374



EUROPE

820E & 822E Models

ATEX Directive (94/9/EC)

II 2 G Ex d IIC T6 Gb

II 2 D Ex tb IIIC T85°C Db IP66

Tamb = -40°C to +75°C

UL International DEMKO A/S (N.B.# 0539)

Certificate # DEMKO 09 ATEX 0815573X Rev. 2

EN 60079-0, 60079-1, 60079-31



Low Voltage Directive (LVD) (2006/95/EC)

UEC compliant to LVD

Products rated lower than 50 VAC and 75 VDC

are outside of the scope of the LVD

The Low Voltage Directive does not apply to products for use in hazardous locations



RUSSIA

820E & 822E Models

Rostekhnadzor Permit and GOST-R CoC

(OPTIONAL - code M406)

1 Ex d IIC T6 X

Tamb = -40°C to +71°C

NANIO CCVE Certification Center

Certificate # POCC US.ГБ05.В04260

ГОСТ Р 51330.0, 51330.1, 51330.10 & 51330-14



UKRAINE

820E & 822E Models

Gosnadzorohrantruda Permit (OPTIONAL - code M404)

1 Ex d IIC T6 X

Ex ia IIC T6 Ga

Tamb = -40°C to +71°C

Certificate #720 by ДБЦІ BE (TCCEXEE)

ГОСТ 12.2.007.0, 22782.0, 22782.6



CHINA

820E & 822E Models

CQST Certified (OPTIONAL - code M408)

Exd IIC T6

DIP A21 TA +85°C

Tamb = -40°C to +75°C

GB 3836.1, 3836.2 & 12476.1

Certificate # CNE09.2180X

Note: Type T800 is an indicating thermometer only and as such carries no approval listings.

TEMPERATURE MODEL CHART

Model	Adjustable Set Point Range		Max. Temp.		Scale Div.		Bulb Size OD x Length
	°F	°C	°F	°C	°F	°C	
1BS*	-180 to 120	-117.8 to 48.9	170	76.7	5	5	3/8 x 3-3/4"
2BS	-125 to 350	-87.2 to 176.7	400	204.4	10	5	3/8 x 2-7/16"
3BS	-125 to 500	-87.2 to 260	550	287.8	10	5	3/8 x 2-1/8"
4BS	-40 to 120	-40 to 48.9	170	76.7	5	2	3/8 x 6-3/4"
5BS	-40 to 180	-40 to 82.2	230	110	5	2	3/8 x 5"
6BS	0 to 250	-17.8 to 121.1	300	148.9	5	2	3/8 x 4-1/2"
7BS	0 to 400	-17.8 to 204.4	450	232.2	10	5	3/8 x 3"
8BS	50 to 650	10 to 343.3	700	371.1	10	10	3/8 x 3-1/4"

Standard capillary length is 6 ft., optional capillary lengths and protection are available, consult UE.

*NOT AVAILABLE TYPE T800

HOW TO ORDER

BUILDING A PART NUMBER

Select a **Type**

Refer to the "Type" section below.

Determine type number based on switch output, enclosure, adjustment and reference.

Fill in the type portion of your part number with the corresponding number.

Select a **Model**

Refer to the "Model Charts."

Determine model based on adjustable range, deadband and proof pressure.

Fill in the model portion of your part number with the corresponding number.

Select an **Option**

Refer to the "Options" section.

Determine option number based on switch output, optional materials or other product enhancements.

Fill in the option portion of your part number with the corresponding number.

Leave "option" portion blank if no options are needed. FOR MULTIPLE OPTIONS: Call United Electric Controls.

TYPE

TEMPERATURE

Type 800 - Bulb and capillary; one SPDT output; external indication

Type 802 - Bulb and capillary; two SPDT outputs; external indication

Type 820E - Bulb and capillary; one SPDT output; external indication, explosion proof

Type 822E - Bulb and capillary; two SPDT outputs; external indication, explosion proof

Type T800 - Bulb and capillary; thermometer only with external indication

OPTIONS

SWITCH OPTIONS* DESCRIPTION

0140	Gold contacts, 1 A 125 VAC resistive. NOT AVAILABLE TYPE 800, 820E, T800
0500	Close deadband, 5 A 125/250 VAC resistive. NOT AVAILABLE TYPE T800
1070	10 A 125 VDC or VAC resistive; deadband and minimum set point may increase. NOT AVAILABLE TYPES 802, 820E, T800
2000	20 A 125/250 VAC resistive. NOT AVAILABLE TYPE T800

OTHER OPTIONS

M007	Drilled 7/8" electrical opening on right side. NOT AVAILABLE TYPES 820E, 822E and T800
M100	Terminal block wiring. NOT AVAILABLE TYPE 820E, 822E (standard) AND T800
M201	Factory set one switch; specify increasing or decreasing temperature and set point. NOT AVAILABLE TYPE 802, 822E, T800
M202	Factory set two switches; specify increasing or decreasing temperature and set point. NOT AVAILABLE TYPE 800, 820E, T800
M300	Enclosure Type 4 construction; includes watertight conduit fitting and gasketing. NOT AVAILABLE TYPES 820E, 822E (which already meet enclosure type 4X)
M320	Tamper resistant cover. NOT AVAILABLE TYPES T800
M404	Flameproof compliance for Ukraine per Gosnadzorohrantruda standards. NOT AVAILABLE TYPES 800, 802, T800
M406	Flameproof compliance for Russia per Rostekhnadzor permit (RTN). NOT AVAILABLE TYPES 800, 802, T800
M408	Flameproof compliance for China per CQST standards. NOT AVAILABLE TYPES 800, 802, T800
M444	Paper ID tag
M446	Stainless steel ID tag & wire attachment; limited to 2 lines of 25 characters each max.
M550	Oxygen service cleaning; alcohol cleaning to remove residue from the process connection
M900	Watertight conduit fitting; converts 7/8" hole to 1/2" NPT fitting. NOT AVAILABLE TYPES 820E, 822E, T800

* All switch options have limited DC capabilities. DC ratings are not listed on nameplate. Consult factory for details.

OPTIONS FOR TEMPERATURE MODELS

UNION CONNECTORS**

Option	Replacement Number	Description
<u>Brass</u>		
W027	SD6213-27	1/2" NPT w/ 3/4" bushing
W045	SD6213-45	3/4" NPT
W051	SD6213-51	1/2" NPT
<u>304 Stainless Steel</u>		
W028	SD6213-28	1/2" NPT w/ 3/4" bushing
W046	SD6213-46	3/4" NPT
W050	SD6213-50	1/2" NPT

THERMOWELLS**

For all bulb & capillary switches

<u>Brass</u>		
W075	SD6225-75	1/2" NPT with 3/4" NPT adapter bushing, 4" BT
W191	SD6225-191	1/2" NPT, 4" BT
W118	SD6225-118	1/2" NPT with 3/4" NPT adapter bushing, 7" BT
W192	SD6225-192	1/2" NPT, 7" BT
<u>316 Stainless Steel</u>		
W076	SD6225-76	3/4" NPT, 4.5" BT
W193	SD6225-193	1/2" NPT, 4.5" BT
W119	SD6225-119	3/4" NPT, 7.5" BT
W177	SD6225-177	1/2" NPT, 7.5" BT

OPTIONAL LENGTHS:

Optional capillary length to 50' may be available in 304 st./st. Armor or Teflon® capillary protection may be available to lengths less than or equal to capillary length. Consult UE for additional information and availability.

Consult UE regarding repeatability and ambient effects on capillary lengths over 30'

**Dimensional drawings for union connectors and thermowells may be found at www.ueonline.com

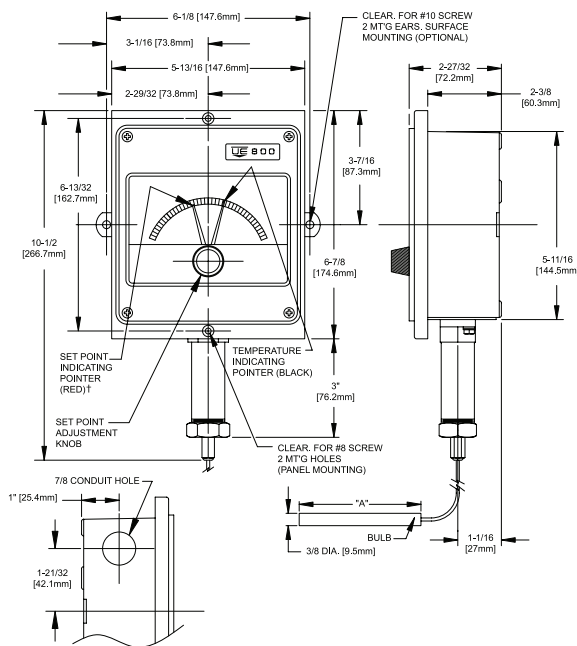
DIMENSIONAL DRAWINGS

(Dimensional drawings for all models may be found at www.ueonline.com)

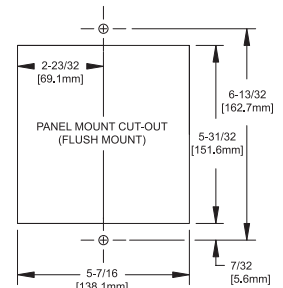
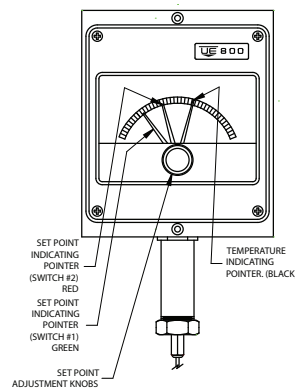
800 Series

External Set Point Adjustment & Temperature Indication

Types 800 & T800

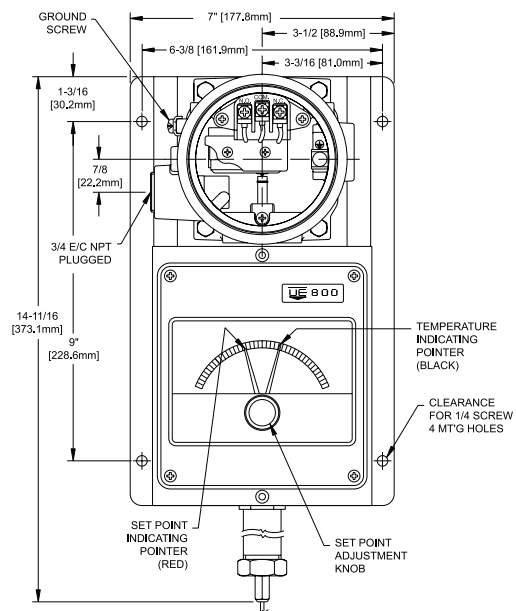


Types 802



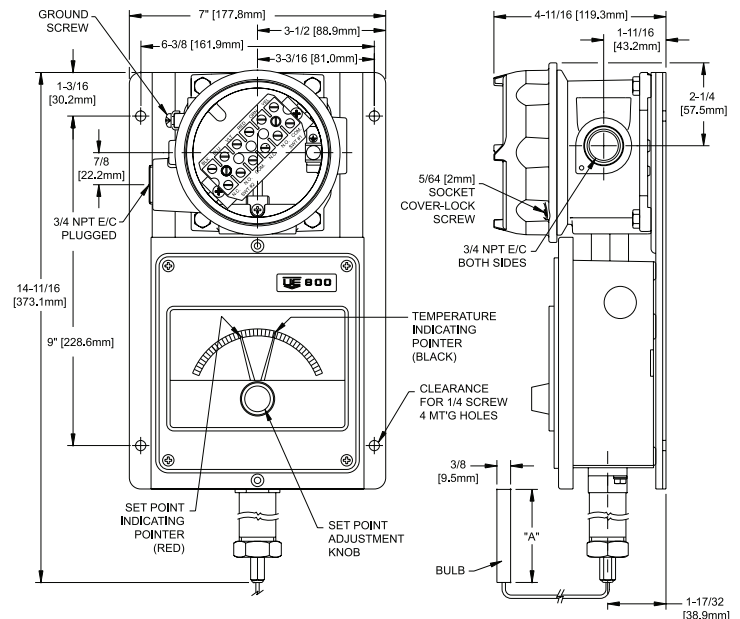
	Dimension A	
Models	Inches	mm
1BS	3-3/4	95.3
2BS	2-7/16	62.0
3BS	2-1/8	54.0
4BS	6-3/4	171.5
5BS	5	127.0
6BS	4-1/2	114.3
7BS	3	76.2
8BS	3-1/4	82.6

Type 820 E



†Type T800 has no set point indicating pointer.

Type 822 E



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 maximum temperature limits stated in literature and on nameplates must never be exceeded, even by surges in the system. Operation of the unit up to maximum pressure or temperature is acceptable on a limited basis (e.g., start-up, testing) but continuous operation must be restricted to the designated adjustable range. Excessive cycling at maximum pressure or temperature limits 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 a dangerous runaway condition could result.
- The adjustable range must be selected so that incorrect, inadvertent or malicious setting at any range point cannot result in an unsafe system condition.
- Install unit where shock, vibration and ambient temperature fluctuations will not damage unit or affect operation. When applicable, orient unit so that moisture does not enter the enclosure via the electrical connection. When appropriate, this entry point should be sealed to prevent moisture entry.
- 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 or faulty display. Check unit immediately.
- Preventative maintenance and periodic testing is necessary for critical applications where damage could endanger property or personnel.
- 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.
- Do not mount unit in ambient temp. exceeding published limits.

LIMITED WARRANTY

Seller 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 Seller (Ex-works, Factory, Watertown, Massachusetts. INCOTERMS); provided, however, that this warranty applies only to equipment found to be so defective within a period of 24 months from the date of manufacture by the Seller. Seller 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 Seller's representatives. EXCEPT FOR THE LIMITED WARRANTY OF REPAIR AND REPLACEMENT STATED ABOVE, SELLER DISCLAIMS ALL WARRANTIES WHATSOEVER WITH RESPECT TO THE PRODUCT, INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE.

LIMITATION OF SELLER'S LIABILITY

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 INPUTTED TO SELLER, IS LIMITED TO THE "LIMITED WARRANTY" OF REPAIR AND/OR REPLACEMENT AS SO STATED IN OUR WARRANTY OF PRODUCT. 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.

UE specifications subject to change without notice.

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