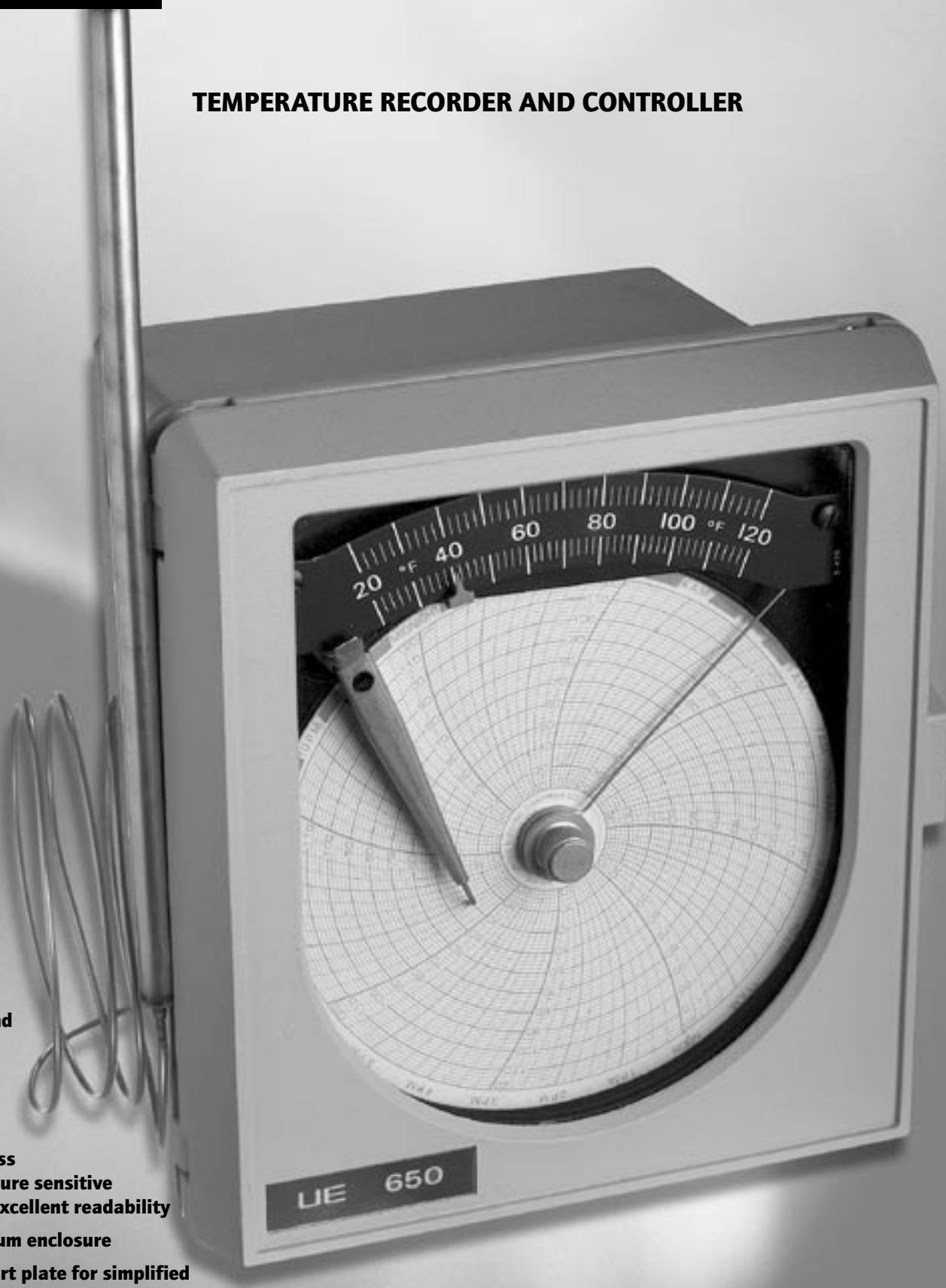


TEMPERATURE RECORDER AND CONTROLLER

FEATURES

- 7 day or 24-hour rotation
- Single or dual SPDT outputs
- Recording thermometer version
- $\pm 1\%$ process and set point scale
- Positive action push-button door latch
- Single pen inkless writing on pressure sensitive chart provides excellent readability
- Die cast aluminum enclosure
- "Swing-out" chart plate for simplified wiring and calibrating





OVERVIEW

The 650 Recorder/Controller has set the standard for many years in applications such as sterilizers, blood storage equipment and other critical areas.

The 650 Series is Designed for cost and space savings, it provides an outstanding combination of temperature control, set point/process indication, and alarm, and recording within one compact, rugged, cast aluminum enclosure. Its recording mechanism ensures that min/max readings are captured even on power-loss.



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SPECIFICATIONS

STORAGE TEMPERATURE	-65 to 160°F (-54 to 71 °C)
CHART DRIVE	115 VAC 60 Hz, 1 rotation per 24 hours (other options available, see page 5)
CHART	6" diameter; recorder trace is black over red printed charts (inkless); high end of range at outer diameter of chart except model 1BSR which is reverse reading
PEN STYLE	Ground sapphire tip; single pen only; push to lift pen
PROCESS SET POINT SCALE	± 1% of range
RECORDING ACCURACY	± 1% of range
ENCLOSURE CLASSIFICATION	Complies with NEMA 1 requirements
SET POINT REPEATABILITY	± 1% of adjustable range
SWITCH OUTPUT	One or two SPDT; dual switches may be separated up to 100% of range; switches may be wired "normally open" or "normally closed"
ELECTRICAL RATING	15 A 125/250 VAC resistive
ENCLOSURE	Die cast aluminum with glass window and door latch, light grey baked enamel finish
WEIGHT	Approximately 8 1/4 lbs.
ELECTRICAL CONNECTIONS	Two 1 3/32" knockouts and one 7/8" diameter knockout
BULB AND CAPILLARY	4 ft. 304 stainless steel
TEMPERATURE FILL	Model 1BSR: solvent; Models 2-8BS: non-toxic oil; Model S18BS: designed for full stroke, high cycle service (eg. sterilizers); consult factory on service life
MOUNTING	Counter-bored holes for panel mount on flanged enclosure front, three mounting ears provided for surface mounting (optional). See dimensional drawings for details.

APPROVALS



UL 873 listed, File # E10667



CSA certified C22.2 no. 24, File # LR7814



CE Compliance to Low Voltage Directive (LVD)



MODEL CHART

Model	Adjustable Set Point Range		Max. Temperature		Scale Division		Chart Division		Bulb Size
	°F	°C	°F	°C	°F	°C	°F	°C	OD x Length (inches)
4 ft. 304 stainless steel bulb and capillary									
1BSR*	-180 to 120	-117.8 to 48.9	170	76.7	5	5	5	5	3/8 x 3 3/4
2BS	-125 to 350	-87.2 to 176.7	400	204.4	10	5	10	5	3/8 x 2 5/8
3BS	-125 to 500	-87.2 to 260	550	287.8	10	10	10	10	3/8 x 2 1/8
16BS	-20 to 100	-28.9 to 37.8	150	65.6	2	1	2	1	3/8 x 8 1/2
14BS	20 to 120	-6.7 to 48.9	170	76.7	2	1	2	1	3/8 x 10 1/4
6BS	0 to 250	-17.8 to 121.1	300	148.9	5	2	5	2	3/8 x 4 1/2
7BS	0 to 400	-17.8 to 204.4	450	232.2	10	5	10	5	3/8 x 3
8BS	50 to 650	10 to 343.3	700	371.1	10	10	10	10	3/8 x 3 1/4
S18BS**	160 to 280	71.1 to 137.8	330	165.6	2	1	2	1	3/8 x 6 3/8

* Reverse reading: low temperature limit at outer portion of chart
 ** Not available with type T650

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 and capillary material.

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 a blank if no options are needed. FOR MULTIPLE OPTIONS: Call United Electric Controls.

TYPE	DESCRIPTION
650	One SPDT output
652	Two SPDT outputs
T650	Recording only with process indicator

RECORDER OPTIONS

M002	60Hz 115 VAC 7 day chart drive. NOT AVAILABLE MODELS 3BS & S18BS
M002C	60Hz 115 VAC 7 day chart drive with Celsius indication. NOT AVAILABLE MODEL S18BS
M003C	50 Hz 115 VAC 7 day chart drive with Celsius indication. NOT AVAILABLE on type 650, 3BS, 8BS, 14BS & 18BS; Types 652, all models except 7BS; type T650, models 3BS, 6BS, 7BS
M005	50 Hz 230 VAC 24 hr. chart drive

SWITCH OPTIONS

0500	Close deadband, 5 A 125/250 VAC resistive. Not available on Types 650 and T650
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GENERAL OPTIONS

M270	Celsius indication. Not required when specifying option codes with "C" suffix
M446	Stainless steel ID tag & wire attachment
M900	Threaded conduit fitting; converts 7/8" hole to 1/2" NPT female fitting. NOT AVAILABLE on Type 652



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, all 1/2" NPT Internal

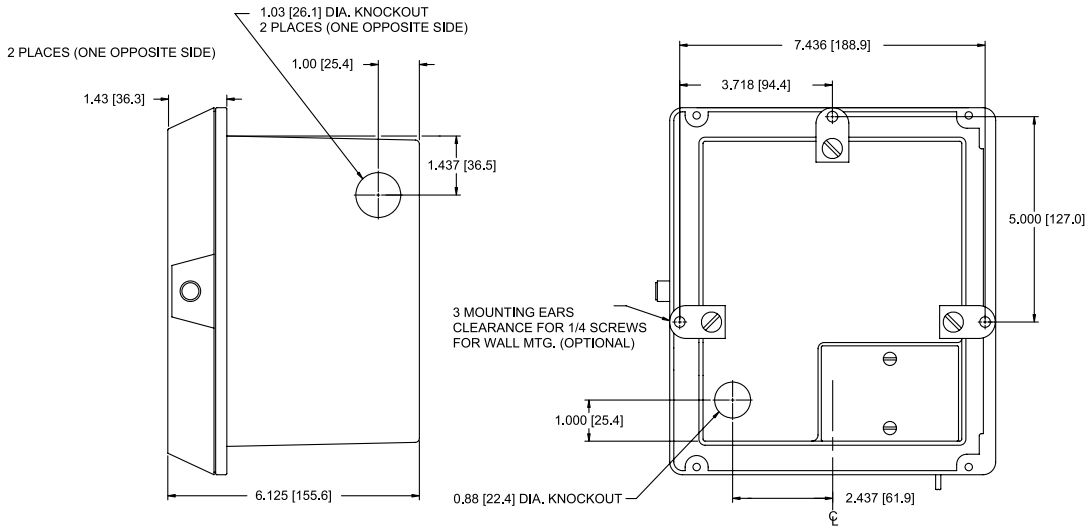
	<u>Brass</u>	
W075	SD6225-75	3/4" bushing adapter, 4" BT. Not available models 6BS, 14BS, 16BS,S18BS
W191	SD6225-191	1/2" NPT, 4" BT. Not available models 6BS, 14BS, 16BS,S18BS
W118	SD6225-118	3/4" bushing adapter, 7" BT. Not available models 14BS, 16BS
W192	SD6225-192	1/2" NPT, 7" BT. Not available models 14BS, 16BS
	<u>316 Stainless Steel</u>	
W076	SD6225-76	3/4" NPT, 4.5" BT. Not available models 6BS, 14BS, 16BS,S18BS
W193	SD6225-193	1/2" NPT, 4.5" BT
W119	SD6225-119	3/4" NPT, 7.5" BT. Not available models 14BS, 16BS
W177	SD6225-177	1/2" NPT, 7.5" BT. Not available models 14BS, 16BS

OPTIONAL LENGTHS:

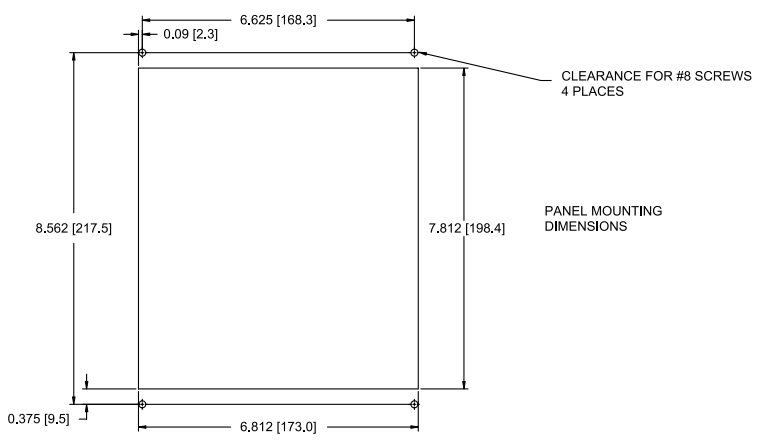
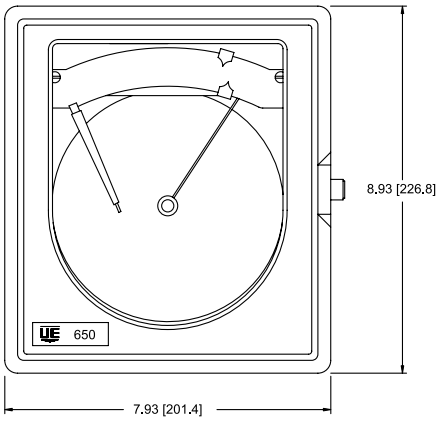
*Optional capillary length to 50' available in copper or 304 st/st. Armor or Teflon® capillary protection available to lengths less than or equal to capillary length. Consult UE for additional information.

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

DIMENSIONAL DRAWINGS



All dimensions stated
in inches (millimeters)



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. 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.
- 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.
- 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 imputed 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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