Series 20000, 21000 and 22000

SNAP-ACTION THERMOSWITCH® Temperature Controller

DESCRIPTION

Available with either single or dual switch control. Control action is provided by an expandable liquid acting on a bellows assembly. Bellows motion, created by volume changes of the liquid, actuates the switch contacts through a push rod.

HIGH LOAD CAPACITY

Current ratings up to 15 amps, 125-250 VAC are available.

FAST RESPONSE

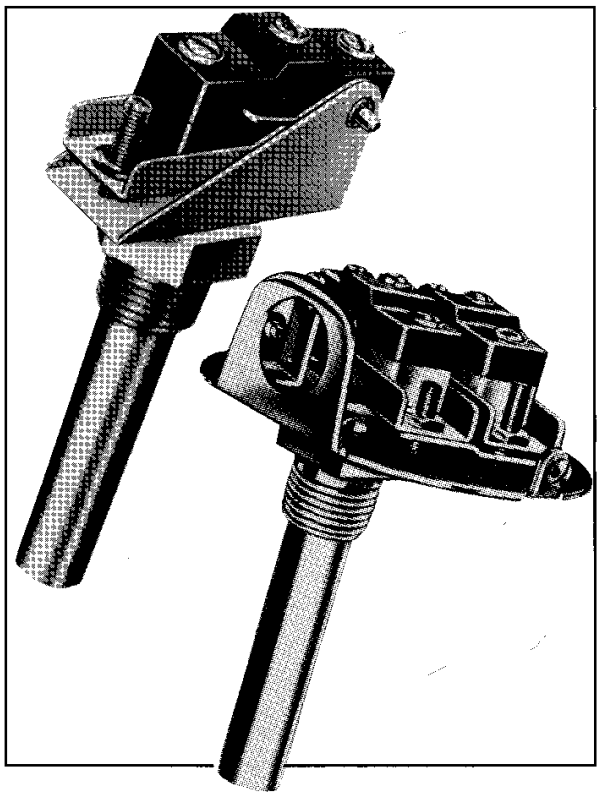
The expandable liquid, which surrounds the bellows, is in direct contact with the temperature sensing outer shell providing a fast response for accurate temperature control.

ADJUSTABLE TERMPERATURE RANGES

An adjustable screw allows simple temperature adjustment. The switch can be set at any temperature within the controller's range. On dual switch units, each switch may be set individually, allowing independent action.

VARIETY OF TEMPERATURE RANGES

Both single and dual switch models are available with overlapping temperature ranges up to 300°F.



SPECIFICATIONS

Temperature Limits

Sensing Bulb
Minimum: -100°F (-75°C)
Maximum: Upper range limit
Snap Switch:
175°F (80°C) maximum

Differential

Approximately 3.5% of span

Pressure Limit

500 psi (3.45 MPa)

Pressure Effect

Set point decreases 1F° per 100 psi applied pressure

Current Rating

See Pages 2 and 3.

NOTE: *Unless otherwise specified all ratings apply to noninductive loads, such as heaters or resistors. Tungsten filament lamps have an inrush of 10 to 15 time the steady state current. Do no exceed switch ratings at any time.*

AC Contactor Size

Any of the snap-action controllers listed is capable of handling motor contactors up to and including size #1. For specific contactor ratings, see Pages 2 and 3.

Corrosion Resistance

Certain gases or liquids (including water at elevated temperatures) could be corrosive and may also cause electrolytic action which could severely shorten the life of the controller. Where corrosion of electrolysis is suspect, plating the brass shell may increase controller life. See Special Feature S.R. 34A. Also, protective wells are available for some models. Because the rate of corrosion or electrolysis is influenced by many systems parameters, such as chemical makeup and temperature of the solution, consult the supplier of our chemicals for suggestions.

Junction Box Finish

Type 208, 227, 228: Baked Gray Enamel
Type 210, 211: Zinc Plate

AGENCY APPROVALS

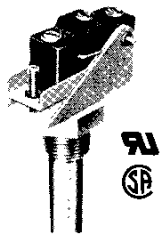
Listed by Underwriters Laboratories (XAPX); U.L. File No. E18974.

Recognized under the Component Program of Underwriters Laboratories (XAPX2). File E18974.

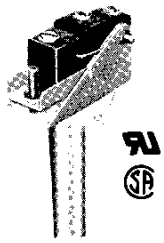
Certified by Canadian Standards Association (Class 4813 02); CSA File No. LR7378.

Specifications subject to change without notice.

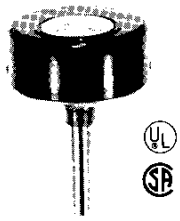
WARNING: *Operation outside specifications could result in failure of the Fenwal product and other equipment with injury to people and property.*



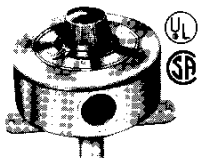
23-0201XX-000
Skeleton Frame, immersion fitting, ½ - 14 N.P.T. 23F° PER TURN Approximate weight is 5.5 ounces (154 grams)



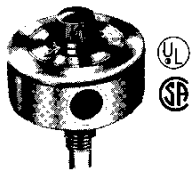
23-0203XX-000
Skeleton Frame, Flange Mount. 23F° PER TURN Approximate weight is 5.5 ounces (154 grams)



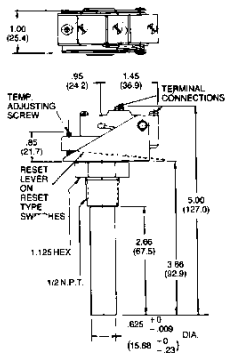
23-0208XX-000
Junction Box. Cover not drip proof. ½ - 14 N.P.T. immersion fitting. 23F° PER TURN Approximate weight is 1 pound (336 grams)

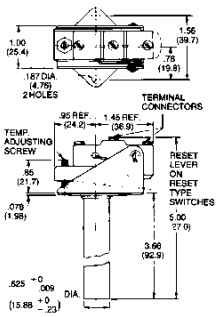


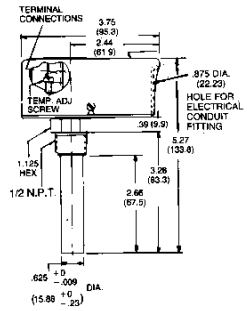
23-0210XX-000
Junction Box. Flange Mount. Moisture-proof cover, external (sealed) adjustment shaft. Drip proof if installed with electric outlet at bottom. Airtight if electrical outlet is sealed. 280F° PER TURN (Shown mid Mod. 30) Meets NEMA 1,2,3,4,12 Approximate weight is 1 pound (336 grams)

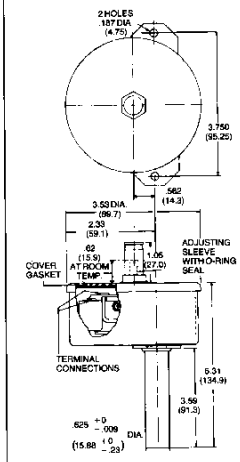


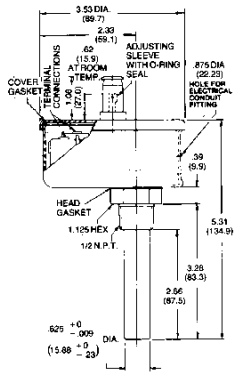
23-0211XX-000
Junction Box. Same as 210 but with immersion fitting. ½ - 14 N.P.T. 280F° PER TURN (Shown with Mod. 30) Meets NEMA 1,2,3,4,12 Approximate weight is 1 pound (336 grams)







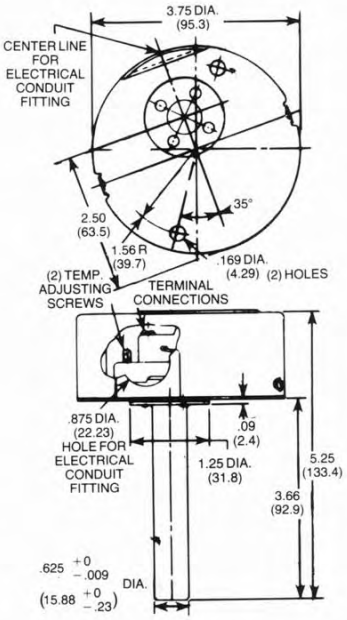




TEMPERATURE RANGE	CATALOG NUMBER BASE NO.	CATALOG NUMBER SUFFIX NO.	CURRENT RATING	AC CONTACTOR SIZE	APPLICABLE MODIFICATIONS (See Page 4)
STANDARD DOUBLE THROW SWITCH — Approximate Differential ± 2F°					
100 to 300°F	201, 203, 208	00	15.0A 125-250 VAC 0.50A 125 VDC 0.25A 250 VDC	2	1, 3 and 36
25 to 225°F		10			
50 to 300°F	210, 211	00			1, 3, 30, 32, 34 and 36
0 to 250°F		10			
NARROW DIFFERENTIAL DOUBLE THROW SWITCH — Approximate Differential ± 1F°					
100 to 300°F	201, 203, 208	03	15.0A 125-250 VAC	1	1, 3 and 36
25 to 225°F		13			
50 to 300°F	210, 211	03			1, 3, 30, 32, 34 and 36
0 to 250°F		13			

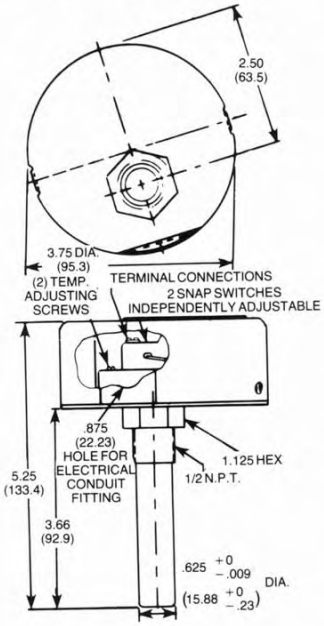
INDEPENDENTLY ADJUSTABLE

23-0227XX-000
Cover not drip proof.
Junction Box.
For air or metal block.
23F° PER TURN
Approximate weight is
1 pound (336 grams)



INDEPENDENTLY ADJUSTABLE

23-0228XX-000
Cover not drip proof.
Junction Box.
½ - 14 N.P.T.
immersion fitting.
23F° PER TURN
Approximate weight is
1 pound (336 grams)



SNAP SWITCH TYPE AND DIFFERENTIAL		TEMPERATURE RANGE	CATALOG NUMBER		CURRENT RATINGS		AC CONTACTOR SIZE		APPLICABLE MODIFICATIONS (See Page 4)
Switch No. 1†	Switch No. 2		BASE NO.	SUFFIX NO.	Switch No. 1†	Switch No. 2	Switch No. 1†	Switch No. 2	
Standard Double Throw ± 2F°		100 to 300°F	227, 228	00	15.0A 125-250 VAC 0.50A 125 VDC 0.25A 250 VDC		2	2	1, 3, and 36
		25 to 225°F		10					
Narrow Differential Double Throw ± 1F°		100 to 300°F		03	15.0A 125-250 VAC		1	1	
		25 to 225°F		13					
Standard D.T. ± 2F°	Narrow Differential D.T. ± 1F°	100 to 300°F		01	150A 125-250 VAC 0.50A 125 VDC 0.25A 250 VDC	15.0A 125-250 VAC	2	1	
		25 to 225°F		11					
Narrow Differential D.T. ± 1F°	Standard D.T. ± 2F°	100 to 300°F		04	15.0A 125-250 VAC	15.0A 125-250 VAC 0.50A 125 VDC 0.25A 250 VDC	1	2	
		25 to 225°F		14					

†Switch No. 1 is nearest electrical outlet hole.

MODIFICATIONS

(1) SPECIAL MARKING, 23-990010-XXX

Special marking may be rubber stamped in indelible ink on a location specified by the user. Amount of marking is limited to the space available. Specify and location of marking desired.

(2) FACTORY TEMPERATURE SETTING 23-990030-006

The controller may be preset at Fenwal to any temperature within its listed range to a minimum of 32˚F (0˚C). A factory preset temperature provides increased accuracy of the switch setting. Specify the temperature setting and which contact (NO or NC) is to open or close on temperature rise or fall. Unless otherwise specified, the normally closed contact will be set to open on a temperature rise at the desired emperature. Factory setting tolerance is ± 3F˚ on Series 20000 and 22000 Controllers and ± 5F˚ on Series 21000 Controllers. Unless this modification is specified, units are preset at approximately 75˚F(25˚C).

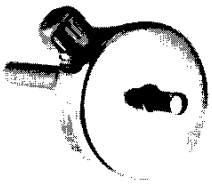
(30) CALIBRATE DIAL AND KNOB, 23-990300-00X

A calibrated dial and knob may be added to any Series 210 or 211 controller.

-000 (30) With temperature range of 50 to 300˚F
-002 (30B) With temperature range of 0 to 250˚F.

(32) MOISTURE RESISTANT FITTINGS 23-99032-00X

A moisture resistant electrical connector may be added to any Series 210 or 211 controller



Mod. No.	Cable, Cord or Conduit Dia. (in)
-001 (32A)	1/8 to 1/4
-002 (32B)	1/4 to 3/8
-003 (32C)	3/8 to 1/2
-005 (32E)	11/16

(34) NONCALIBRATIED DIAL AND KNOB 23-990340-000

A noncalibrated dial and knob with nonsignificant numerals may be added to any Series 210 or 211 controller.

(36) HEAT EXCHANGER FINS, 23-990360-000

Heat exchanger fins may be added to any controller for use in air sensing applications where faster response is required.

SPECIAL FEATURE

(34A) PLATING, 23-980340-001

To overcome certain corrosive conditions, the brass shell of any controller may be plated with tin, zinc, or nickel. Specify SF 34A and plating material.

PROTECTIVE WELLS

Type 321 Stainless Steel low pressure hex head wells are available for series 203, 210, and 227 controllers. Specify Catalog Number 34-011208-000.