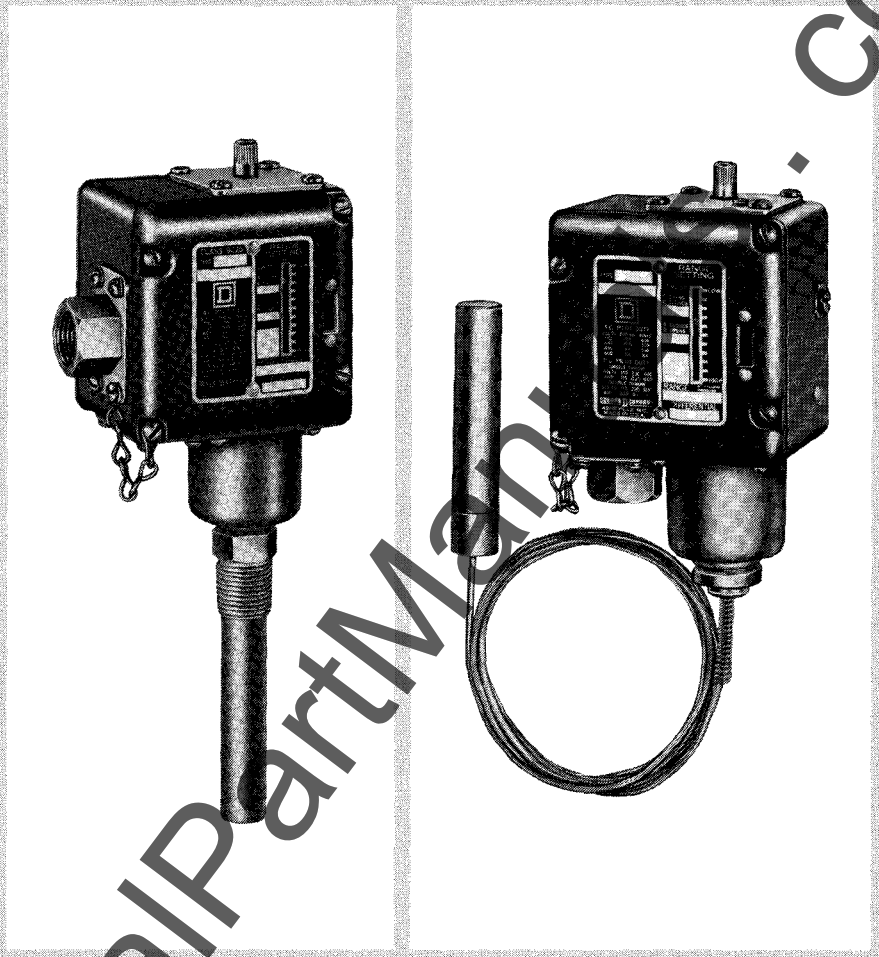


Temperature Switches

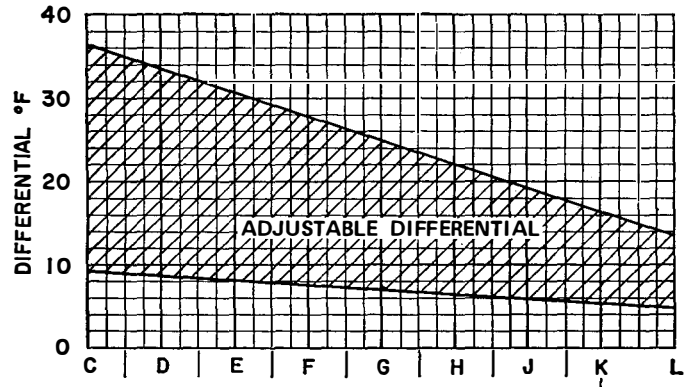
CONTENTS

SQUARE D COMPANY

TEMPERATURE SWITCHES
TYPES BCW, BFW

DIFFERENTIAL TABLES (FOR BCW 54, 64 SEE NEXT PAGE)

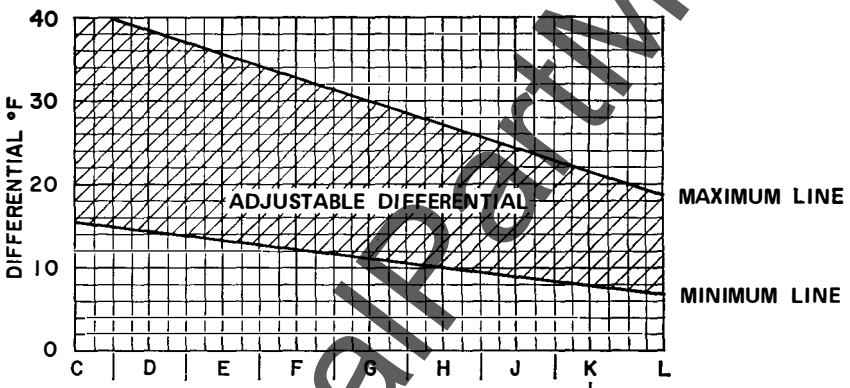
SINGLE POLE TYPES



BCW-36	BFW-36	0	10	20	30	40	50	60	
BCW-33	BFW-33	80	90	100	110	120	130	140	145
BCW-32	BFW-32	145	155	165	175	185	195	205	210
BCW-35		210	220	230	240	250	260	270	275
BCW-34		275	285	295	305	315	325	335	340

RANGE (Low operating temperature) Add differential to range to obtain high operating temperature.

DOUBLE POLE TYPES



BCW-46	BFW-46	0	10	20	30	40	50	60	
BCW-43	BFW-43	80	90	100	110	120	130	140	145
BCW-42	BFW-42	145	155	165	175	185	195	205	210
BCW-45		210	220	230	240	250	260	270	275
BCW-44		275	285	295	305	315	325	335	340

RANGE (Low operating temperature) Add differential to range to obtain high operating temperature.

AVAILABLE MODIFICATIONS	Form	Adder Price
Substitute Side Conduit for Bottom Conduit	B2	$ 7.
Push Button — Manual and Automatic Re-Set, Non-Locking	E1	20.
Push Button — Push-to-Test	E2	20.
Push Button — Lock Out or In on Rising Temperature, Manual Re-Set Only	E3	12.
Push Button — Lock Out or In on Falling Temperature, Manual Re-Set Only	E4	12.
Pilot Light — Lights on Falling Temperature, Clear lens cap, 250 V. Max.	G1	28.
Pilot Light — Lights on Rising Temperature, Clear lens cap, 250 V. Max.	G2	28.
Pilot Light — Lights on Falling Temperature, Red lens cap, 250 V. Max.	G5	28.
Pilot Light — Lights on Rising Temperature, Red lens cap, 250 V. Max.	G6	28.
Range Adjustment Knob	K	4.
Substitute 6′ of Armored Capillary Tubing for Standard Capillary	LA6	6.
Substitute 12′ of Capillary Tubing for Standard Capillary	L12	6.
Substitute 12′ of Armored Capillary Tubing for Standard Capillary	LA12	17.
Substitute 16′ of Capillary Tubing for Standard Capillary	L16	9.
Substitute 16′ of Armored Capillary Tubing for Standard Capillary	LA16	26.
Sealing Cap	V	4.
NEMA 4 Enclosure — Similar to NEMA 12 Except with Watertight Gasketing	W1	14.
Range Locking Nut	Z4	8.

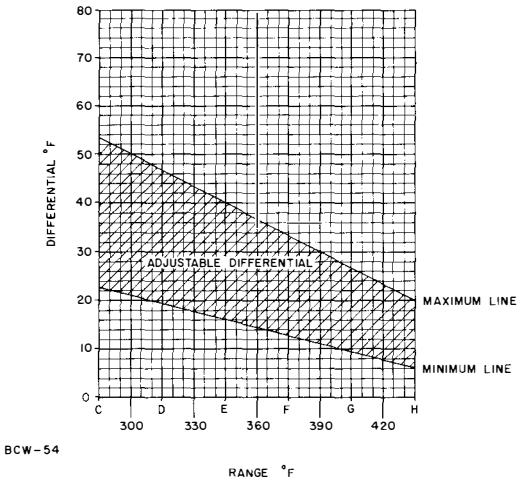
ORDERING INFORMATION REQUIRED

1—Specify Class 9025, Type. . . . . Give settings within the Range and Differential limits shown on these sheets. Stock switches at standard settings will be furnished on all orders unless the quantity is greater than 25 or unless the order states "MUST BE SET".

2—If modifications are desired add the appropriate form letter to the class and type. Arrange form letters in alphabetical sequence when ordering more than one modification.

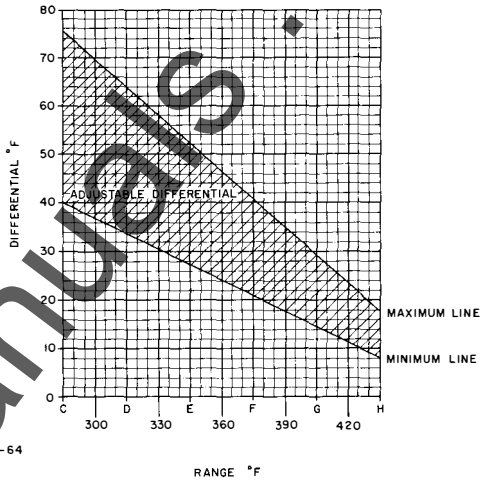
TEMPERATURE SWITCHES
TYPES BCW, BFW

DIFFERENTIAL TABLES FOR BCW 54, 64



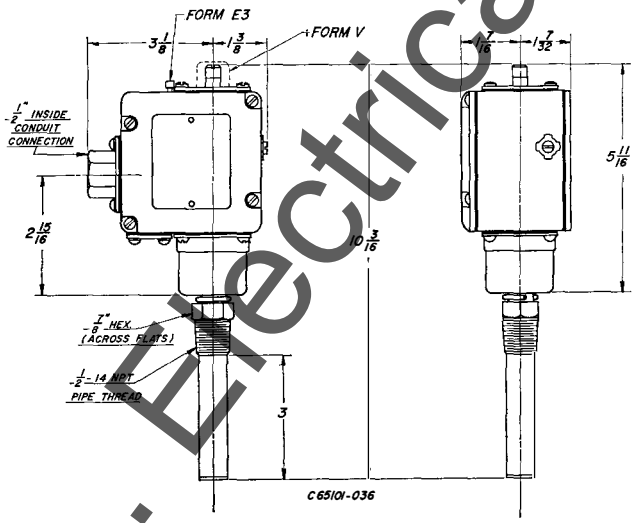
BCW-54

Range (low operating temperature) Add differential to range to obtain high operating temperature.

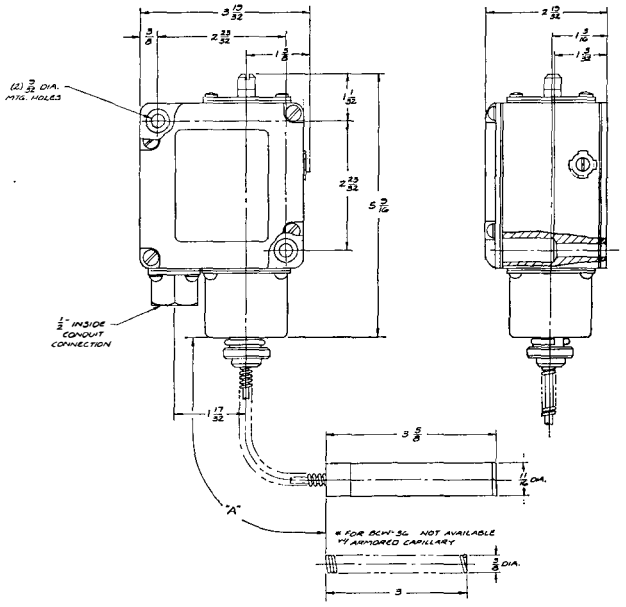


BCW-64

Range (low operating temperature) Add differential to range to obtain high operating temperature.



Type BFW



Length of Capillary Dim. "A"	FORM	
	Without Armor	*With Armor
6 Ft.	Stnd.	LA6
12 Ft.	L12	LA12
16 Ft.	L16	LA16

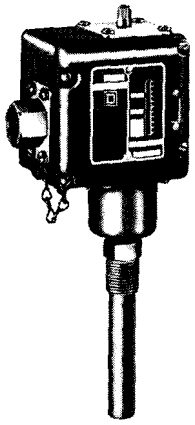
Type BCW

SQUARE D COMPANY

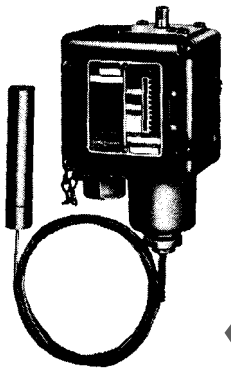
1/81 TP Printed in U.S.A.

TEMPERATURE SWITCHES — TYPES BCW, BFW

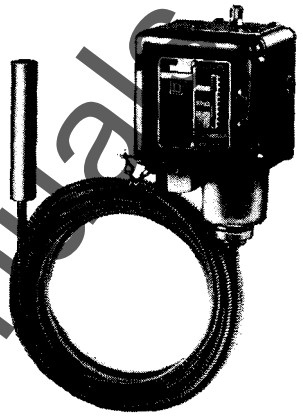
FOR THE AUTOMATIC CONTROL OF TEMPERATURE MAINTAINING EQUIPMENT IN INDUSTRIAL AND GENERAL DUTY APPLICATIONS



Class 9025
Type BFW



Class 9025
Type BCW



Class 9025 Type BCW
with armored capillary

INDUSTRIAL TYPE ENCLOSURES ARE DIE CAST ALUMINUM, DRIP TIGHT AND OIL RESISTANT

Heating Types — Except for the BCW and BFW 36 and 46 these temperature controllers are recommended for heating applications where the temperature to be controlled is higher than the normal or ambient temperature. Where the ambient temperature may vary from a value below the control point to a value above it, the use of a universal or cross ambient bulb would be required. The 9025 BCW and BFW are not intended for this service.

Cooling Types — The BCW and BFW 36 and 46 are for applications where the temperature to be controlled is lower than the normal or ambient temperature.

Applications — Controlling the temperature of liquid baths, bearings, internal combustion engines, large air compressors, etc., are possible applications for these devices.

Maximum Allowable Temperatures and Pressures — The third column in the table below lists the maximum allowable temperature for each device. The thermal elements of these devices will withstand pressures up to 3,000 p.s.i. The wells described on Page 4 will withstand 2500 p.s.i. The tank fitting, also on Page 4, should not be subjected to more than 100 p.s.i.

CLASS 9025 — **NON CROSS AMBIENT HEATING TYPE CONTROLS** — **NEMA 12 ENCLOSURES**

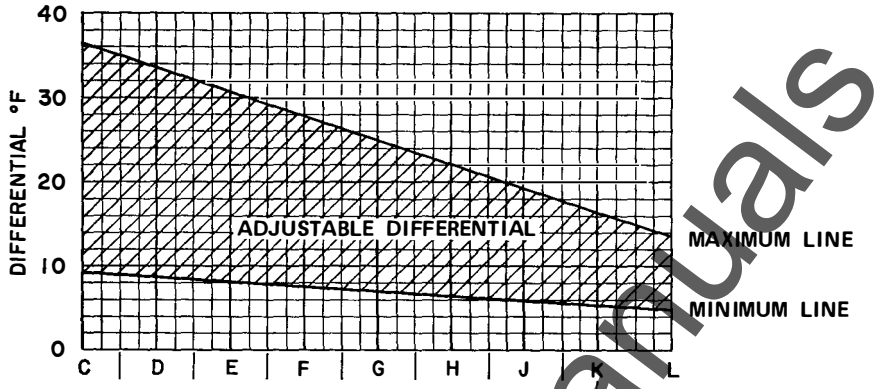
Range ° F. Falling Temp. (at sea level)	Differential ° F. Adds to Range	Maximum Allowable Temperature	Contact Arrangement	Type	Price	Thermal Element
0–60★	See Table next page	150° F.	1 N.O.—1 N.C.	BCW 36	$39.80	Capillary and Bulb Type
			2 N.O.—2 N.C.	BCW-46	43.80	
80–145	See Table next page	190° F.	1 N.O.—1 N.C.	BCW 33	39.80	1 1/16" dia. x 3 5/8" long bulb, with 6' of 3/32" dia. tubing (Vertical or Horizontal Immersion) When mounting bulb horizontally, side of bulb marked "top" should be up.
			2 N.O.—2 N.C.	BCW 43	43.80	
145–210	See Table next page	260° F.	1 N.O.—1 N.C.	BCW 32	39.80	
			2 N.O.—2 N.C.	BCW 42	43.80	
210–275	See Table next page	320° F.	1 N.O.—1 N.C.	BCW 35	39.80	
			2 N.O.—2 N.C.	BCW 45	43.80	
275–340	See Table next page	380° F.	1 N.O.—1 N.C.	BCW 34	39.80	
			2 N.O.—2 N.C.	BCW 44	43.80	
275–450	See Table page 3	500° F.	1 N.O.—1 N.C.	BCW 54	39.80	
			2 N.O.—2 N.C.	BCW 64	43.80	
0–60★	See Table next page	150° F.	1 N.O.—1 N.C.	BFW 36	32.80	Direct Connected Type 1 1/16" dia. x 3" long element with 1/2-14 NPT (Vertical Immersion)
			2 N.O.—2 N.C.	BFW 46	36.80	
80–145	See Table next page	190° F.	1 N.O.—1 N.C.	BFW 33	32.80	
			2 N.O.—2 N.C.	BFW 43	36.80	
145–210	See Table next page	260° F.	1 N.O.—1 N.C.	BFW 32	32.80	
			2 N.O.—2 N.C.	BFW 42	36.80	

★These are cooling type controls (bulb always cooler than ambient).

TEMPERATURE SWITCHES — TYPES BCW, BFW

Differential Tables (for BCW 54, 64 see page 3)

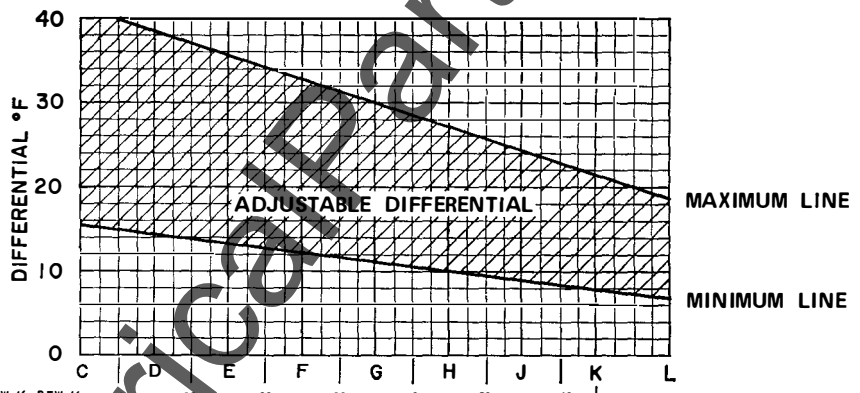
SINGLE POLE TYPES



BCW-36	BFW-36	0	10	20	30	40	50	60	
BCW-33	BFW-33	80	90	100	110	120	130	140	145
BCW-32	BFW-32	145	155	165	175	185	195	205	210
BCW-35		210	220	230	240	250	260	270	275
BCW-34		275	285	295	305	315	325	335	340

RANGE (Low operating temperature) Add differential to range to obtain high operating temperature.

DOUBLE POLE TYPES



BCW-46	BFW-46	0	10	20	30	40	50	60	
BCW-43	BFW-43	80	90	100	110	120	130	140	145
BCW-42	BFW-42	145	155	165	175	185	195	205	210
BCW-45		210	220	230	240	250	260	270	275
BCW-44		275	285	295	305	315	325	335	340

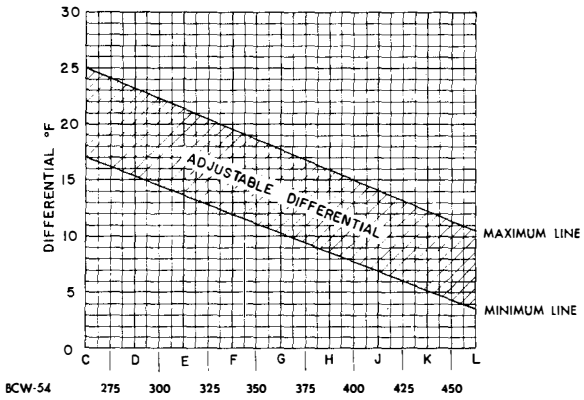
RANGE (Low operating temperature) Add differential to range to obtain high operating temperature.

AVAILABLE MODIFICATIONS	Form	Adder Price
Substitute Side Conduit for Bottom Conduit	B2	$ 1.75
Push Button — Manual and Automatic Re-Set, Non-Locking	E1	5.00
Push Button — Push-to-Test	E2	2.00
Push Button — Lock Out or In on Rising Temperature, Manual Re-Set Only	E3	3.00
Push Button — Lock Out or In on Falling Temperature, Manual Re-Set Only	E4	3.00
Pilot Light — Lights on Falling Temperature	G1	7.00
Pilot Light — Lights on Rising Temperature	G2	7.00
Range Adjustment Knob	K	1.10
Substitute 6′ of Armored Capillary Tubing for Standard Capillary	LA6	1.20
Substitute 12′ of Capillary Tubing for Standard Capillary	L12	1.20
Substitute 12′ of Armored Capillary Tubing for Standard Capillary	LA12	3.60
Substitute 16′ of Capillary Tubing for Standard Capillary	L16	2.00
Substitute 16′ of Armored Capillary Tubing for Standard Capillary	LA16	5.20
Sealing Cap	V	1.10
NEMA 4 Enclosure — Similar to NEMA 12 Except with Watertight Gasketing	W1	3.50
Range Locking Nut	Z4	2.00

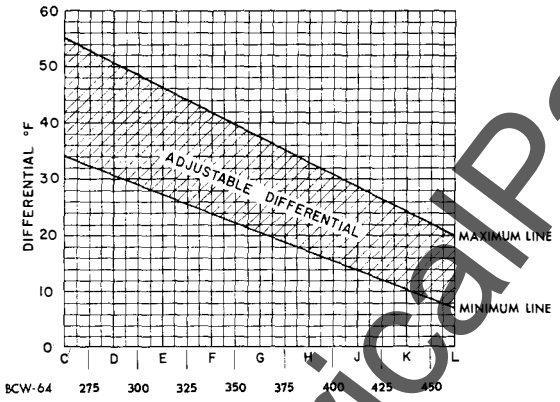
ACCESSORIES		Price
Class 9049 Type A-8A Tank Fitting — Use with Older BCW Devices Having ⅛″ Diam. Tubing	.....	$ 3.50
Class 9049 Type A-8B Tank Fitting — Use with Current BCW Devices — 3/32″ Diam. Tubing	.....	3.50
Class 9049 Type A-30 Well — For 9025 BFW Types	Brass	4.15
Class 9049 Type A-34 Well — For 9025 BCW Types	Brass	4.40
Class 9049 Type A-31 Well — For BFW Types	Stainless Steel	14.50
Class 9049 Type A-35 Well — For BCW Types	Stainless Steel	15.50

TEMPERATURE SWITCHES — TYPES BCW, BFW

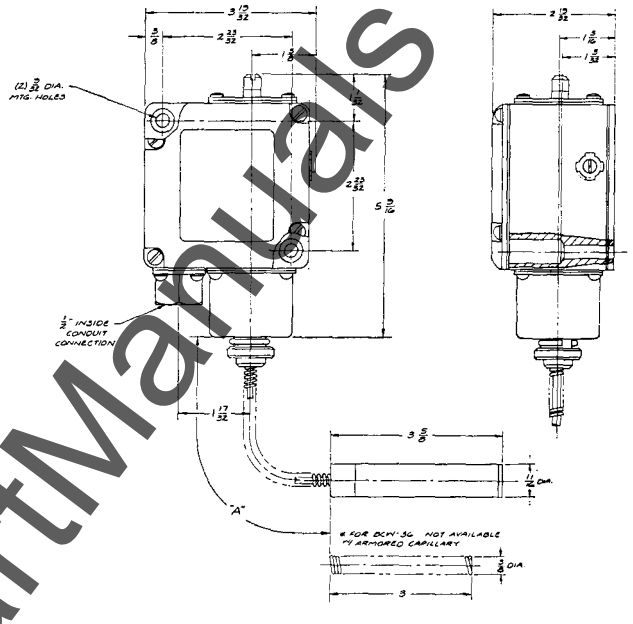
Differential Tables for BCW 54, 64



Range (low operating temperature) Add differential to range to obtain high operating temperature.

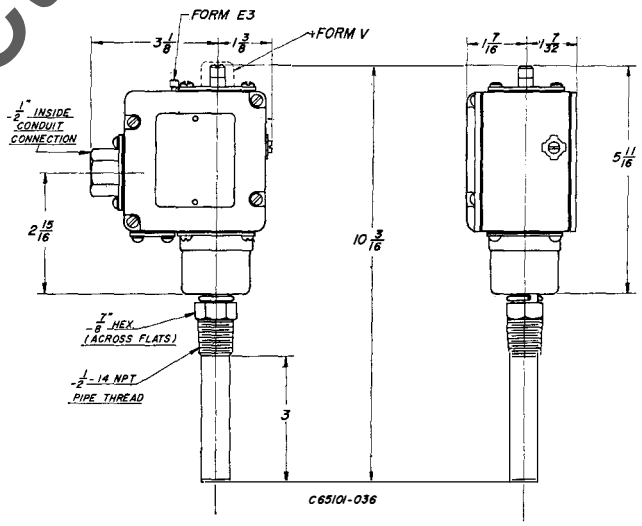


Range (low operating temperature) Add differential to range to obtain high operating temperature.



Length of Capillary Dim. "A"	FORM	
	Without Armor	*With Armor
6 Ft.	Stnd.	LA6
12 Ft.	L12	LA12
16 Ft.	L16	LA16

Class 9025 Type BCW



Class 9025 Type BFW

TEMPERATURE SWITCHES — TYPES BCW, BFW

ELECTRICAL CONTACT RATINGS

Contacts	Volts	AC Inductive Pilot Duty 35% Power Factor — Make Amps.	Make VA	Break Amps.	Break VA	Continuous Carrying Amperes	AC Resistive 75% Power Factor — Make, Break and Continuous Carrying Amperes	Volts	DC Inductive Pilot Duty and Resistive — Make and Break Amperes: Single Throw	Double Throw	Continuous Carrying Amperes
SPDT, SPST ‡	110	40	....	15	....	15	15	115	0.5	0.25	15
	220	20	....	10	....	15	15	230	0.25	0.1	15
	440	10	....	6	....	15	15	600	0.05	....	15
	800	8	....	5	....	15	15				
DPDT, DPST	115	30	3450	3	345	10	10	115	1.0	0.2	10
	230	15	3450	1.5	345	10	10	230	0.3	0.1	10
	460	7.5	3450	0.75	345	10	10	600	0.1	....	10
	575	6	3450	0.6	345	10	10				

Type	Contact Arrangement	Contact Symbol
Single Pole Double Throw	1 N.O.—1 N.C.	
Double Pole Double Throw	2 N.O.—2 N.C.	

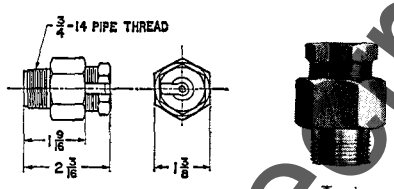
Contacts are single pole, double throw — one circuit normally open and one circuit normally closed. These circuits are electrically separate, but cannot be used on opposite polarities.
‡Single throw version suitable for ½ hp at 115 and 230 Volts AC.

Each pole is electrically separate from the other and can be used on opposite polarities. The contacts of each pole are single pole, double throw — these circuits are electrically separate but cannot be used on opposite polarities.

TANK FITTING AND WELL

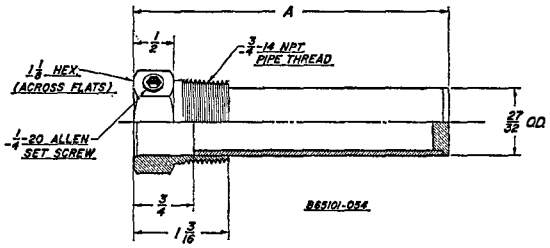
The Class 9049 A-8 tank fittings are used with BCW type controls when the bulb is inserted into a tank or through a metal wall. These brass fittings include two split washers and packing material.

Use of the Class 9049 Type A "well" permits removal of the control without draining the tank or manifold. To insure good conductivity, filling the well with silicone oil is recommended, or silicone grease may be used when bulb mounting is horizontal. The oil recommended is DOW CORNING #710 or #550 fluid. The grease recommended is DOW CORNING #41.

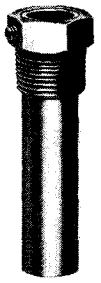


Class 9049 Type A8-A, A8-B

Tank fitting



Class 9049 Type A-30, A-34, A-31, A-355
A = 3 1/16"


Well

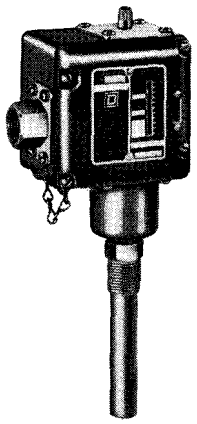
ORDERING INFORMATION REQUIRED

1—Specify Class 9025, Type..... Give settings within the Range and Differential limits shown on these sheets. Stock switches at standard settings will be furnished on all orders unless the quantity is greater than 25 or unless the order states "MUST BE SET".

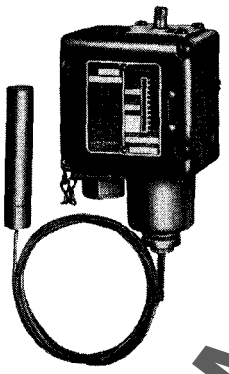
2—If modifications are desired add the appropriate form letter to the class and type. Arrange form letters in alphabetical sequence when ordering more than one modification.

TEMPERATURE SWITCHES

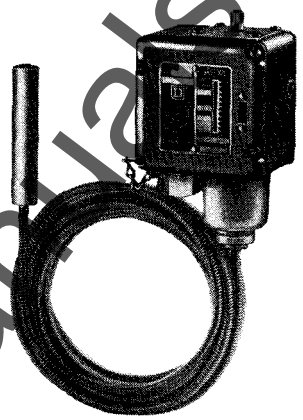
APPLICATION DATA



Class 9025
Type BFW



Class 9025
Type BCW



Class 9025 Type BCW
with armored capillary

The Class 9025 Temperature Switches are designed for automatic control of temperature maintaining equipment.

These temperature controllers are recommended for heating applications where the temperature to be controlled is higher than the normal or ambient temperature. In general the application would be in connection with the controlling of liquids rather than gases due to the relatively greater conductivity between element and liquid as compared to conductivity between element and gas (i.e. air, etc.). Where air or gas temperature is to be controlled, the differential listing as shown will be somewhat altered. In general, the sensitivity decreases and the difference between "on and off" will widen.

Control of temperature through solid conduction is also permissible, but adequate contact between bulb and solid should be assured. Where the ambient temperature may vary from a value below the control point to a value above it, the use of a universal or cross ambient bulb would be required. The 9025 BCW and BFW are not intended for this service. Such applications as liquid baths, bearing temperature control, etc., suggest possible applications.

INDUSTRIAL AND GENERAL DUTY — **NEMA 12 ENCLOSURES**

CLASS 9025 — **HEATING TYPE CONTROL — NOT AMBIENT COMPENSATED**

Range ° F. Falling Temp. (at sea level)	Differential ° F. Adds to Range	Maximum Allowable Temperature	Contact Arrangement	Type	Price	Thermal Element
0–60 *	See Table next page	150° F.	1 N.O.—1 N.C.	BCW 36 *	**$39.80**	Capillary and Bulb Type
			2 N.O. –2 N.C.	BCW 46 *	**43.80**	
80–145	See Table next page	190° F.	1 N.O.—1 N.C.	BCW 33	**39.80**	1 1/16" dia. x 3 5/8" long bulb, with 6' of 3/32" dia. tubing (Vertical or Horizontal Immersion) * * *
			2 N.O.—2 N.C.	BCW 43	**43.80**	
145–210	See Table next page	260° F.	1 N.O.—1 N.C.	BCW 32	**39.80**	
			2 N.O.—2 N.C.	BCW 42	**43.80**	
210–275	See Table next page	320° F.	1 N.O.—1 N.C.	BCW 35	**39.80**	
			2 N.O.—2 N.C.	BCW 45	**43.80**	
275–340	See Table next page	380° F.	1 N.O.—1 N.C.	BCW 34	**39.80**	
			2 N.O.—2 N.C.	BCW 44	**43.80**	
80–145	See Table next page	190° F.	1 N.O.—1 N.C.	BFW 33	**32.80**	Direct Connected Type 1 1/16" dia. x 3" long element with 1/2-14 NPT (Vertical or Horizontal Immersion) * * *
			2 N.O.—2 N.C.	BFW 43	**36.80**	
145–210	See Table next page	260° F.	1 N.O.—1 N.C.	BFW 32	**32.80**	
			2 N.O.—2 N.C.	BFW 42	**36.80**	

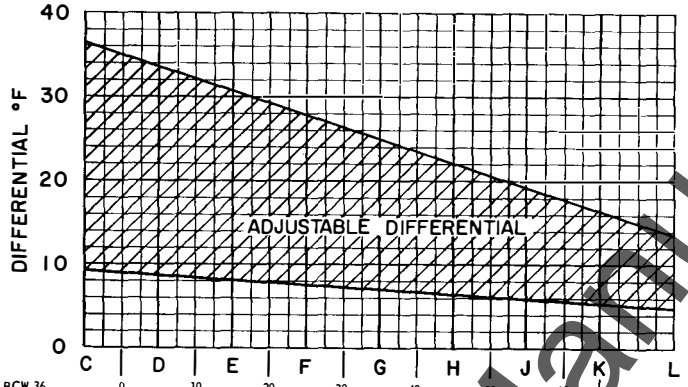
*Cooling type control. (Bulb always cooler than ambient).
* * *When mounting bulb horizontally, side of bulb marked "Top" should be up.

NEW SHEET

TEMPERATURE SWITCHES

Differential Tables

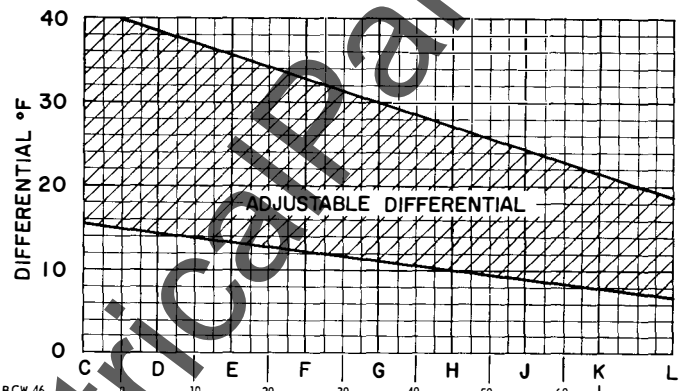
SINGLE POLE TYPES



BCW.36	0	10	20	30	40	50	60	
BCW.33 BFW.33	80	90	100	110	120	130	140	145
BCW.32 BFW.32	145	155	165	175	185	195	205	210
BCW.35	210	220	230	240	250	260	270	275
BCW.34	275	285	295	305	315	325	335	340

RANGE (Low operating temperature) Add differential to range to obtain high operating temperature.

DOUBLE POLE TYPES



BCW.46	0	10	20	30	40	50	60	
BCW.43 BFW.43	80	90	100	110	120	130	140	145
BCW.42 BFW.42	145	155	165	175	185	195	205	210
BCW.45	210	220	230	240	250	260	270	275
BCW.44	275	285	295	305	315	325	335	340

RANGE (Low operating temperature) Add differential to range to obtain high operating temperature.

SPECIAL FEATURES	Form	Adder Price
Substitute Side Conduit for Bottom Conduit	B2	$ 1.75
Push Button — Manual and Automatic Re-Set, Non-Locking	E1	3.00
Push Button — Push-to-Test	E2	2.00
Push Button — Lock Out or In on Rising Temperature, Manual Re-Set Only	E3	3.00
Push Button — Lock Out or In on Falling Temperature, Manual Re-Set Only	E4	3.00
Pilot Light — Lights on Falling Temperature	G1	7.00
Pilot Light — Lights on Rising Temperature	G2	7.00
Range Adjustment Knob	K	1.10
Substitute 6′ of Armored Capillary Tubing for Standard Capillary	LA6	1.20
Substitute 12′ of Capillary Tubing for Standard Capillary	L12	1.20
Substitute 12′ of Armored Capillary Tubing for Standard Capillary	LA12	3.60
Substitute 16′ of Capillary Tubing for Standard Capillary	L16	2.00
Substitute 16′ of Armored Capillary Tubing for Standard Capillary	LA16	5.20
Sealing Cap	V	1.10
Range Locking Nut	Z4	2.00

ACCESSORIES		Price
Class 9049 Type A-8A Tank Fitting — Use with Older BCW Devices Having 1/8″ Diam. Tubing	.....	$ 3.50
Class 9049 Type A-8B Tank Fitting — Use with Current BCW Devices — 3/32″ Diam. Tubing	.....	3.50
Class 9049 Type A-30 Well — For 9025 BFW Types	Brass	4.15
Class 9049 Type A-34 Well — For 9025 BCW Types	Brass	4.40
Class 9049 Type A-31 Well — For BFW Types	Stainless Steel	14.50
Class 9049 Type A-35 Well — For BCW Types	Stainless Steel	15.50

TEMPERATURE SWITCHES

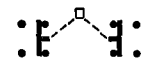
ELECTRICAL RATINGS

Volts	SINGLE POLE AC Pilot Duty Amperes ‡		SINGLE POLE DC * Pilot Duty Amperes		DOUBLE POLE AC Ampere Rating 10 Amp. 600 V AC Max. AC Pilot Duty Rating			DOUBLE POLE DC ◆ Pilot Duty Amperes	
	Normal	Inrush	Double Throw	Single Throw	Volts	Normal	Inrush	Double Throw	Single Throw
110	15 A.	40 A.	0.25	0.5	115	3.0 A.	30. A.	0.2	1.0
220	10 A.	20 A.	0.1	0.25	230	1.5 A.	15 A.	0.1	0.3
440	6 A.	10 A.	.....	.....	460	.75 A.	7.5 A.	....	.....
600	5 A.	8 A.	.....	0.05	600	.57 A.	5.7 A.	.....	0.1

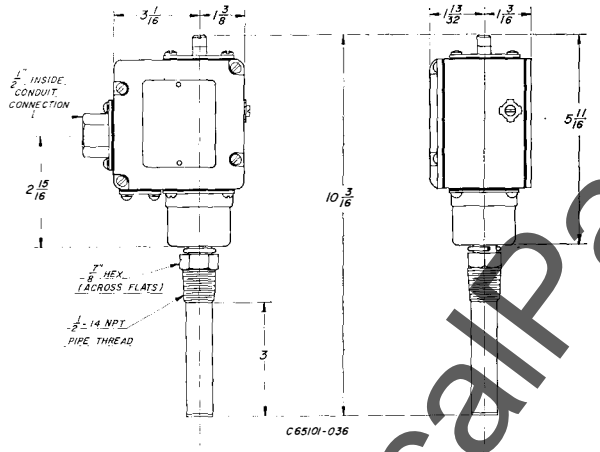
‡Single throw version suitable for ½ hp at 115 and 230 volts ac.

Type	Contact Arrangement	Contact Symbol
Single Pole Double Throw	1 N.O.—1 N.C.	

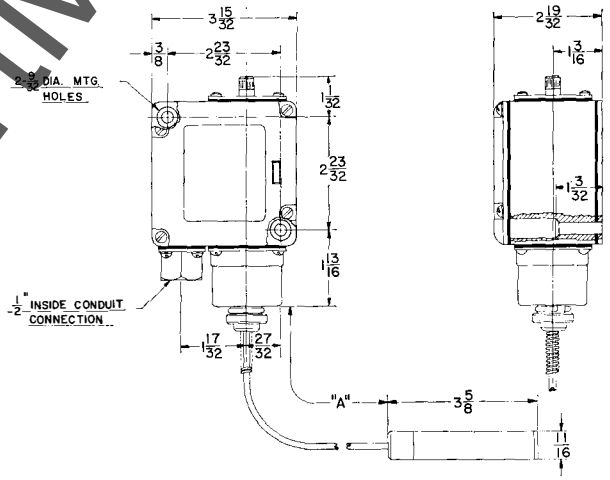
Contacts are single pole, double throw — one circuit normally open and one circuit normally closed. These circuits are electrically separate, but cannot be used on opposite polarities.

Type	Contact Arrangement	Contact Symbol
Double Pole Double Throw	2 N.O.—2 N.C.	

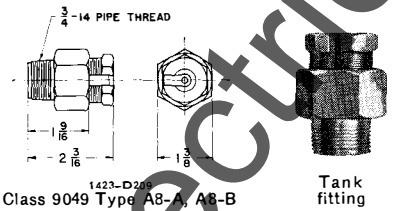
Each pole is electrically separate from the other and can be used on opposite polarities. The contacts of each pole are single pole, double throw — these circuits are electrically separate but cannot be used on opposite polarities.



Class 9025 Type BFW



Class 9025 Type BCW



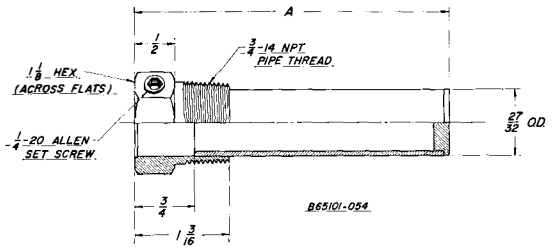
Class 9049 Type A8-A, A8-B

Tank fitting

TANK FITTING AND WELL

The Class 9049 A-8 tank fittings are used with BCW type controls when the bulb is inserted into a tank or through a metal wall. These brass fittings include two split washers and packing material.

Use of the Class 9049 Type A "well" permits removal of the control without draining the tank or manifold. To insure good conductivity, filling the well with silicone oil is recommended, or silicone grease may be used when bulb mounting is horizontal.



Class 9049 Type A-30, A-34, A-31, A-35

Well

ORDERING INFORMATION REQUIRED

1—Specify Class 9025, Type..... Give settings within the Range and Differential limits shown on these sheets.

2—If special features are desired add the appropriate form..... to the class and type. Arrange form letters in alphabetical sequence when ordering more than one special feature.

SPECIAL TEMPERATURE SWITCHES

Class 9025 pressure switches having "S" numbers following the Type number are listed below. Only the special nature of the switch is described. All other features are the same as the standard switch, with or without Forms.

TYPE	FORM	DESCRIPTION	ORIGINAL CUSTOMER	REMARKS	LIST PRICE
BCW2-S- BCW22-S BCW3-S	–	All current 9025 BCW2, 9025 BCW3, and 9025 BCW22 Specials are restricted to E.M.D. For replacement devices, customer should contact: Electro-Motive Division, General Motors La Grange, Illinois 60525 Phone (312) 387-6000	E.M.D.	Restricted Sale	
BCW32-S3	B2LA6V	¾-14 NPT union, mounting bracket, Set: 193+2°F rising, min. Diff'l.	Detroit Diesel		**$240.00**
BCW32-S4	B2LA10V	¾-14 NPT union, mounting bracket, Set: 193+2°F rising, min. Diff'l.	Detroit Diesel		**$251.00**
BCW34-S2	E3LA12	1-⅛" Bellows, Set: 400°F rising	Quincy Compressor		**$258.00**
BCW35-S3	–	½-14 NPT with 18" capillary	Textile Technology		**$225.00**
BCW42-S1	LA12	½-14 NPT, Customer #11905301	Fairbanks-Morse		**$258.00**
BCW43-S1	LA12	½-14 NPT, Customer #11905146	Fairbanks-Morse		**$258.00**
BCW45-S1	LA12	½-14 NPT, Customer #11905148	Fairbanks-Morse		**$258.00**
BCW64-S1	E3	Set: 440°-450°F, with water resistant features	Heintz Electric		**$253.00**
BFW32-S1	–	Range: 100°-200°F, calibrated to 100°-125°F	Buffalo Electric		**$168.00**
BFW32-S2	–	Element designed for horizontal mounting	Circuit Engr Co		**$168.00**
BFW43-S1	E3	Set: 115°-125°F with water resistant features	Heintz Electric		**$218.00**
BGW	–	All 9025 BGW special switches are restricted to E.M.D. For replacement devices, customer should contact: Electro-Motive Division, General Motors La Grange, Illinois 60525 Phone (312) 387-6000	E.M.D	Restricted Sale	

* Device must be ordered with these Forms. Price **includes** price of Forms listed.