

## High Temperature Sensor No. 83197-J Series

### GENERAL DESCRIPTION

The No. 83197-J Series High Temperature Sensor contains a snap-acting valve operated by temperature variations around the integral sensing bulb. It is used to vent a pneumatic signal when the setpoint is reached. The sensor has provisions for piped vent operation and is designed for use with Robertshaw pneumatic system components.

The control pressure must be provided through an .8 mm (.032") diameter or smaller orifice for correct operation.

### SPECIFICATIONS

#### Construction

- Body** ..... Nickel-plated cast brass
- Bulb** ..... Stainless Steel
- Rod** ..... Quartz
- Levers** ..... Nickel-plated steel
- O-Rings** ..... Silicone and fluorocarbon
- Cover** ..... Stainless Steel
- Gaskets** ..... Copper and asbestos, and silicone sponge rubber.
- Springs** ..... Stainless and plated steel.

#### Models Available:

83197-XX

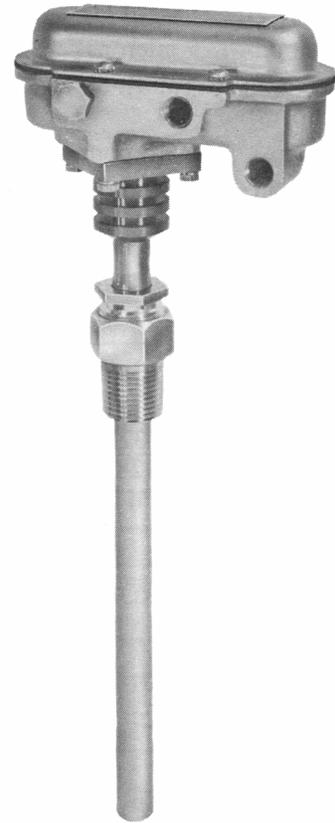
Suffix	Control Pressure kPa (psi)	Range, °C. (°F.)	Reset Differential °C. (°F.)
J3	138 to 209	-18 to 425	6 to 7
	(20 to 30)	(0 to 800)	(11 to 13)
J4	241 to 448	-18 to 425	4.5 to 9.0
	(35 to 65)	(0 to 800)	(8 to 16)
J5	138 to 209	370 to 700	6 to 7
	(20 to 30)	(700 to 1300)	(11 to 13)
J6	241 to 448	370 to 700	4.5 to 9.0
	(35 to 65)	(700 to 1300)	(8 to 16)

TABLE 1

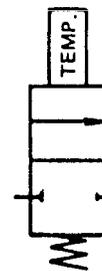
**Reset Differential:** ..... Non-adjustable. See Table 1.  
**Maximum Bulb Temperature:**.... 700° C. (1300° F.)  
**Maximum Ambient Temperature:** .150° C. (300° F.)  
**Maximum Bulb Pressures:**

°C (°F.)	kPa (PSI)
95(200)	6895 (1000)
205.4 (400)	5516 (800)
315 (600)	4827(700)
425 (800)	4482(650)
540 (1000)	4137 (600)
650 (1200)	1551 (225)
700 (1300)	690 (100)

**CAUTION: DO NOT EXCEED MAXIMUM  
 TEMP/PRESS RATINGS**



Handle instrument with care to avoid damage to sensing element.



J. I. C. Symbol

**SPECIFICATIONS (Continued):**

Approx. Shipping Weight:..... 9 Kg. (2 lbs.)

**Repeatability:**

Setpoint Temp. - °C. (°F.)	Repeatability - °C. (°F.)
-18 to 315 (0 to 600)	±2.8(5)
315 to 700 (600 to 1300)	±5.6 (10)

**Control Medium:** .....Air, Natural Gas, Nitrogen  
**Filtration (minimum):** ..... 25 microns  
**Moisture (Pressure Dewpoint):** 8° C. (15° F.) less than ambient temperature.

**Oil Content (natural base):** ..... 5 ppm.  
**Oil Content (synthetic base):** ..... 0 ppm.  
**Hydrogen Sulfide:** ..... 0 ppm.

**ORDERING INFORMATION**

Specify:

1. Model No.
2. Setpoint (if desired)
3. Special features (such as thermowell No.  
 83237-A2 (1/2" - 14 NPT) or No. 83237-B2  
 (3/4" - 14 NPT) for 11.7 mPa (1700 psi). No.  
 28764-A2 (3/4"- 14 NPT) for pressures up to  
 58.7 mPa (8500 psi)
4. Tagging

**INSTALLATION - See Figure 1**

**Bulb Location**

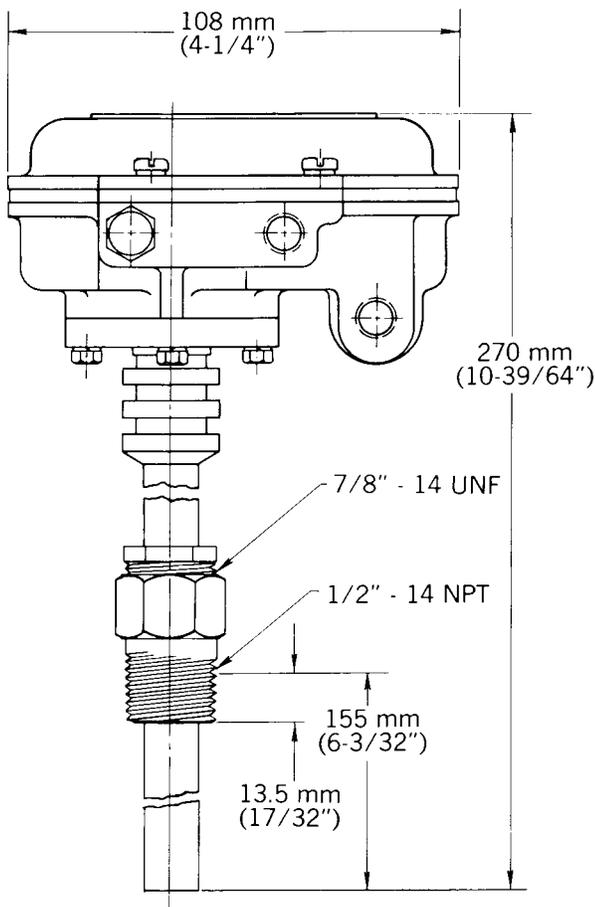
Correct location is the most important detail of sensor installation. The bulb should be installed at a point of true representative temperature in good circulation with maximum insertion depth. If a thermometer is used, its sensing element should be installed adjacent to the bulb.

**Mounting**

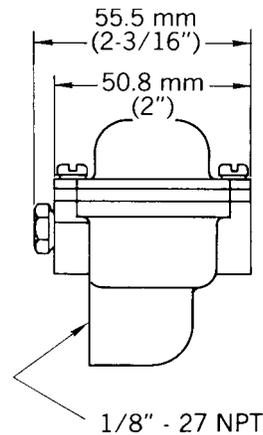
The 83197-J Series High Temperature Sensor may be mounted in any position, but vertical (upright) is recommended. Vent openings should have fittings installed turned down. Care should be taken to prevent foreign matter from entering the valve ports during installation.

If the sensor is out of doors or in any way exposed to water during cleaning, etc., the sensor should be mounted in a position which will prevent water entry into the body. Water trapped in the body will impair operation and could freeze during winter months. The 1/8" - 27 NPT connections can be used for piped vent operation if gas is used.

Unless ordered with a thermowell, each sensor model is equipped with a bushing with 1/2" - 14 NPT external threads.



**CAUTION: Do not use pipe wrench, channel locks, etc. on body or bulb assembly when tightening into bushing or thermowell.**



Handle instrument with care to avoid damage to sensing element.

Figure 1

To mount sensor, loosen union plug (see Figure 2) and remove bushing. Install bushing in desired location. Install sensor in bushing, positioning sensor with the desired port location. Tighten union plug to 25-30 ft-lb. Do not over tighten.

### Connections

The sensor has two 1 / 8" - 27 NPT connections used for control pressure and piped vent operation. Control pressure must be provided through a .8 mm (.032") or smaller diameter orifice.

**CAUTION: The piped vent from the sensor cannot be used as a supply source for any other equipment. If sensor venting is restricted in this or any other manner, faulty operation will result.**

Tubing and fittings used to connect the sensor must be free of chips, dirt, moisture, or other foreign matter.

If a thread compound is used, it should be nonhardening, "anti-seize" type applied to the second or third male thread in moderate amount. Do not allow any compound inside the sensor. Thread sealing tape is not recommended.

### Thermowell

NOTE: When using a thermowell, the bushing gland, and two gaskets (see figure 3, details 10, 11 and 12) are not used. However, a gasket (detail 31) is required.

The thermowell is used to protect the bulb from corrosion, high pressures, etc., and to permit sensor removal from the pipe or vessel without draining the system. Install the thermowell as described above for the bushing.

When the bulb is protected by a thermowell, some loss in rate of response is experienced due to the additional metal thickness and insulating effect of the dead air space between the bulb and thermowell. To install, insert the sensor bulb into the thermowell and tighten the union plug.

### OPERATION - See Figure 2

With an increase in temperature, the stainless steel bulb expands more than the quartz rod. This differential expansion causes the stem to move downward. This downward movement allows the lever assembly to rotate clockwise around pivot point "A" with the spring producing the needed force. The lever assembly now contacts the valve stem forcing it off the O-ring seat, allowing the pressure at the control port to be vented.

### ADJUSTMENTS - See Figure 2 Setpoint

**CAUTION: Read adjustment instructions completely before beginning calibration or connecting test equipment. Do not clamp sensor in a vice or similar tool while making calibrations. Distortion on the sensor will cause a shift in setpoint or impair operation.**

The setpoint may be adjusted within the limits of the temperature range and control pressure in the following manner:

1. Remove the cover.
2. Apply the operating control pressure through a .8 mm (.032") or smaller diameter orifice. Orifice size must be the same as that used during normal operation.
3. Allow the sensor to stabilize in a well-adjusted oil or water bath or furnace at the desired setpoint.
4. If the sensor is not already closed, turn the adjusting screw clockwise to stop the venting.
5. Slowly turn the adjusting screw counterclockwise until the control pressure is vented.
6. Lower the bulb temperature until the sensor resets. Slowly raise [2° F. (1.1° C.) per minute maximum the bulb temperature to the setpoint and check the sensor for proper operation. If the sensor does not vent at the setpoint, repeat steps 4 through 6 until proper operation is obtained.
7. Replace the cover.

### MAINTENANCE - See Figure 3

**WARNING**  
Use care when disassembling. Spring forces present.

**CAUTION: Do not subject O-rings or gaskets to cleaning fluid, acetone, or any halogenated hydrocarbons such as degrease liquids, etc. Clean only with a soft, dry cloth. Metal parts can be cleaned with a suitable solvent then dried thoroughly before reassembly.**

For rod maintenance, remove the four screws (detail 6) and carefully separate the bulb assembly from the body. Remove the stem and rod from the bulb assembly. The O-ring (detail 16) may also be removed. If a broken rod cannot be removed, replace bulb assembly and other needed parts. If the broken rod can be removed, be sure to remove all residual pieces from the bulb assembly. Replace the defective parts and reassemble being careful to position the O-ring (detail 16) correctly. Recalibrate the setpoint per the Adjustment section.

For O-ring (detail 20) maintenance, remove the four cover screws, cover, plug, and spring (detail 25). Note that the stem and rod can be removed once the lever assembly is removed. Remove the stem and rod or make other provision to prevent the rod from being accidentally broken. Remove the lever assembly. Spring (detail 4), washer, and thrust washer can also be removed. Remove the guide, then O-ring from valve stem. Replace the defective O-ring and reassemble being careful to reposition all parts correctly. Recalibrate per the Adjustment section.

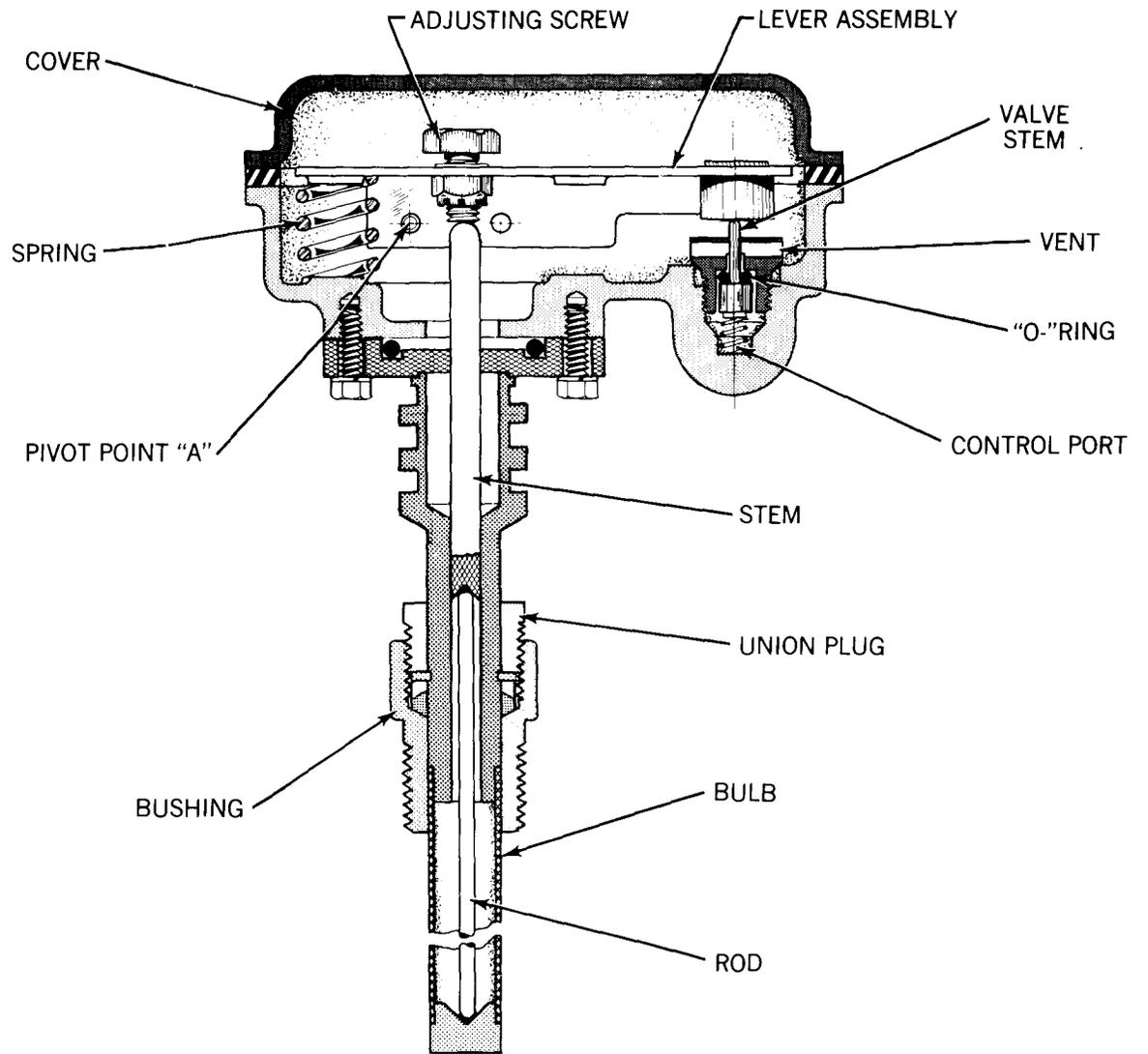


Figure 2

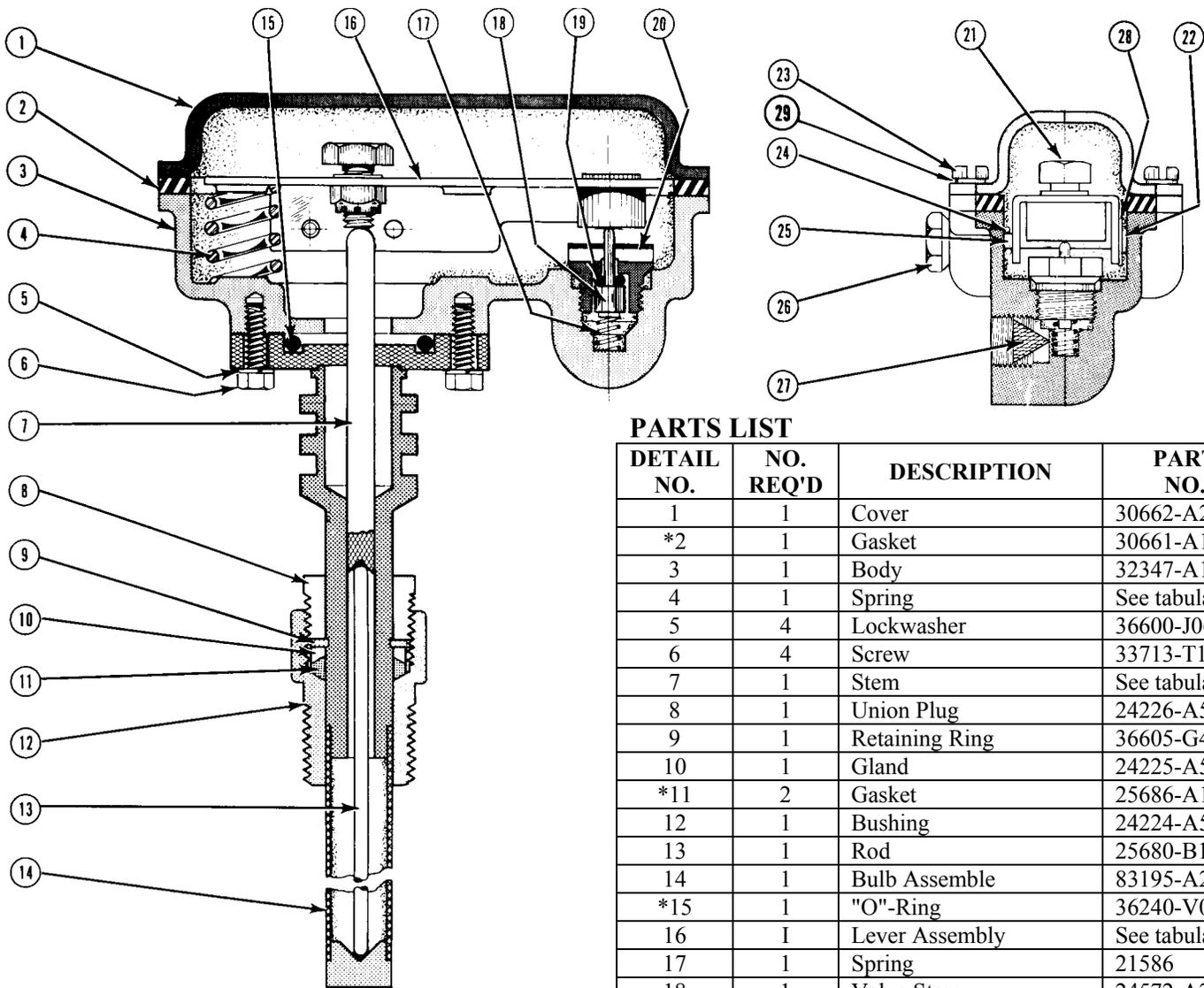


Figure 3

**PARTS LIST**

DETAIL NO.	NO. REQ'D	DESCRIPTION	PART NO.
1	1	Cover	30662-A2
*2	1	Gasket	30661-A1
3	1	Body	32347-A1
4	1	Spring	See tabulation
5	4	Lockwasher	36600-J0609
6	4	Screw	33713-T1309
7	1	Stem	See tabulation
8	1	Union Plug	24226-A5
9	1	Retaining Ring	36605-G4
10	1	Gland	24225-A5
*11	2	Gasket	25686-A1
12	1	Bushing	24224-A5
13	1	Rod	25680-B1
14	1	Bulb Assemble	83195-A2
*15	1	"O"-Ring	36240-V0024
16	1	Lever Assembly	See tabulation
17	1	Spring	21586
18	1	Valve Stem	24572-A2
*19	1	"O"-Ring	36240-51006
20	1	Guide	24573-B1
21	1	Pointer Label	30672-A1
22	1	Thrust Washer	30667-A1
23	4	Cover Screw	33711-A0909
24	1	Spring	27895-A1
25	1	Dowel Pin	30664-A1
26	1	Plug	30665-A1
27	2	Strainer	25908-A1
28	1	Washer	27024-A1
29	4	Lockwasher	36600-J0510
30	1	Nameplate (not shown)	See tabulation
*31	1	Gasket (not shown)	24102-A1
32	1	Thermowell (not shown)	28764-A2
33	1	Thermowell (not shown)	83237-A2
34	1	Thermowell (not shown)	83237-B2

**TABULATION**

MODEL NO.	DETAIL 4	DETAIL 7	DETAIL 16	DETAIL 30
83197-J3	30671-A1	32344-C2	82229-A4	32353-F5
83197-J4	30671-B1	32344-C2	82229-A3	32353-F6
83197-J5	30671-A1	32344-C3	82229-A4	32353-F7
83197-J6	30671-B1	32344-C3	82229-A3	32353-F8

\*Recommended spare parts - See following note.  
 NOTE: When a thermowell is used, details 10, 11 and 12 are not required, but detail 31 is required.

# Robertshaw

## U.S.A. and CANADA

Robertshaw Industrial Products Division

1602 Mustang Drive

Maryville, TN 37801

Phone: (865) 981-3100 Fax: (865) 981-3168

<http://www.robertshawindustrial.com>

## Exports

Invensys Appliance Controls

2809 Emerywood Parkway

P.O. Box 26544

Richmond, Virginia 23261-6544

Phone: (804) 756-6500 Fax: (804) 756-6561