



**READ
BEFORE USE**



BS&B SAFETY SYSTEMS, L.L.C.
BS&B SAFETY SYSTEMS LTD.

Installation Instructions

Types BAS+™, ABAS+™, LDAS+™ and ALDAS+™ Sensors

This installation instruction to be used in conjunction with the installation instructions for the Rupture Disk and Safety Head types used.

Warning: Rupture disks are intended to provide a pressure relief opening. Rupture disks are designed to burst at a specified pressure & temperature, thereby relieving excess pressure or preventing excessive vacuum in a system. **Rupture disks and sensors must be properly installed and safely vented in order to avoid bodily injury, damage to property, pollution and loss of product.** BS&B Safety Systems L.L.C. and BS&B Safety Systems Ltd. supply disks and sensors selected by their customers, which are manufactured in reliance upon information and specifications supplied by the customer. BS&B Safety Systems L.L.C. and BS&B Safety Systems Ltd. are not liable for any damage resulting from improper installation, improper system design, unsafe venting or other factors beyond BS&B Safety Systems L.L.C. and BS&B Safety Systems Ltd. control. Do not locate rupture disk devices where personnel, equipment or property will be exposed to released product and pressure through the disk. Handle carefully, disk and tag may have sharp edges.

Order Replacement Sensors by Lot Number (Shown on Sensor Tag)

BEFORE INSTALLING THE SENSOR

1. Inspect companion pipe flanges.

- Ensure flange-mating surfaces are free of foreign materials, pits, dust or grit which can damage the sensor affecting performance or cause leakage.
- Ensure pipe flanges are parallel to a sufficient standard that will permit proper functioning of the sensor.

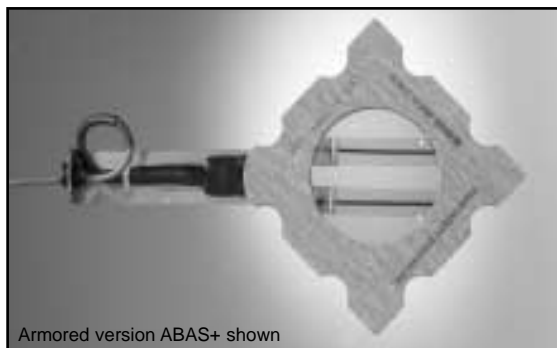
2. Inspect Sensor.

Do not remove sensor from its package until it is required for installation. Handle the sensor with care, holding the sensor by the perimeter only. Examine the sensor checking the membrane and gasket for tears, scratches and foreign material that can damage the sensor, cause leakage, lead to false signals or otherwise affect the electrical or mechanical performance of the sensor.

- Do not install a damaged sensor, for example, if the wire circuit mounted on the orange polyamide support has been severed, or if there is any damage to the polyamide membrane. Installation of a damaged sensor may result in a false signal or leakage.
- Ensure that the size and pressure rating of the sensor are compatible with the companion flanges. The perimeter shape of the sensor matches the shape of a type SRB-7RS Safety Head for easy alignment.
- Do not rub the sensor membrane. Clean using only a damp cloth
- Do not fold, twist or stretch the sensor as this may break or weaken the conductive circuit and cause a false signal.
- Handle carefully, sensor and tag may have sharp edges.
- Sensor does not produce excessive surface temperatures, infra-red, electromagnetic or ionising radiation when appropriately powered according to these instructions.
- Do not subject the sensor to excessive structural bending stresses through the pipe flanges.
- Select gasket materials appropriate to the service conditions.
- Check that the performance characteristics of the sensor match that required by the application.

Safety Precautions - Caution

- Competent trained personnel should install sensor devices in accordance with these installation



Armored version ABAS+ shown

instructions and user electrical requirements.

- Do not locate where the sensor membrane may be exposed to snow, ice, heavy rain or subjected to pressure or pressure evacuation in the vent piping. This may break the sensor wire.
- The LDAS+ and ALDAS+ sensors operate by allowing a small pressure differential build-up to occur across the sensing membrane. This must be taken into account when specifying rupture disks or other relieving device up-stream of the LDAS+ or ALDAS+.
- Do not locate where the sensor to cable connection may be damaged from bending or stress.
- The sensor is not designed for dust service conditions.
- Check that all the sensor materials are compatible with the process conditions to avoid false signal generation due to corrosive attack.
- The sensor should not be installed in contact with conductive process media as this may cause a false signal.
- Ensure that the opening of the sensor does not affect the performance of downstream equipment. All the Burst Alert® Sensor Plus types will open with a petal of material extending one pipe diameter in the direction of flow.
- The sensor must not be modified in any way except with the approval of BS&B Safety Systems L.L.C. or BS&B Safety Systems Ltd. Unapproved modification may effect pressure containment and/or sensor performance. Failure to obtain such approval voids the warranty on this product. Do not reinstall a sensor that has been used between pipe flanges even if the conductor has not broken. The impression in the gasket seating area taken by the sensor during its original installation may prevent proper sealing and effect sensor performance if re-installed.

- Each sensor is provided with integral gaskets. Do not remove or modify gaskets before use as this may effect sealing to the pressure system and damage the sensor.
- Where a back-pressure exists on a sensor this must be considered during the specification of the sensor to prevent damage and to avoid sensor failure. Contact BS&B Safety Systems L.L.C. or BS&B Safety Systems Ltd. for further information.

NOTE: LDAS+ and ALDAS+ sensor are not recommended for use where a back pressure exists on the sensor.

For assistance or advice on the compatibility of process media with the sensor, contact BS&B Safety Systems, L.L.C. or BS&B Safety Systems Ltd.

INSTALLATION

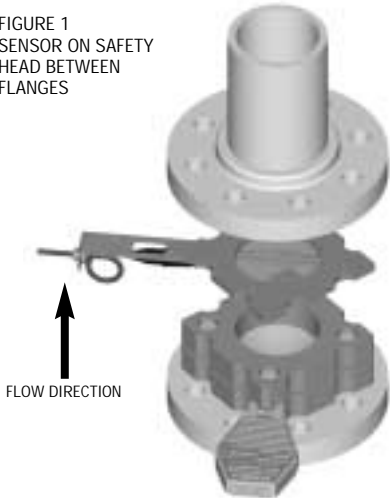
Follow the steps below for proper installation

The sensor is typically installed on the VENT SIDE of the rupture disk between the Safety Head outlet and the companion flange outlet Figure 1.

(The sensor may also be mounted directly between companion flanges, See Figure 2.

When installing the LDAS+ or ALDAS+ sensor, ensure that the side marked 'VENT SIDE' is orientated towards the downstream pipework.

FIGURE 1
SENSOR ON SAFETY
HEAD BETWEEN
FLANGES



WARNING

Should the LDAS+ sensor be installed upside down, the device will not function as intended to detect leakage.

1. Install the sensor in the pipeline before connecting the electrical monitoring equipment. When uninstalling a sensor, disconnect the electrical monitoring equipment prior to removal of the sensor from the piping System.

2. Follow the procedure as indicated in the rupture disk Installation Instructions and tighten the flanges stud nuts to the specified torque value.

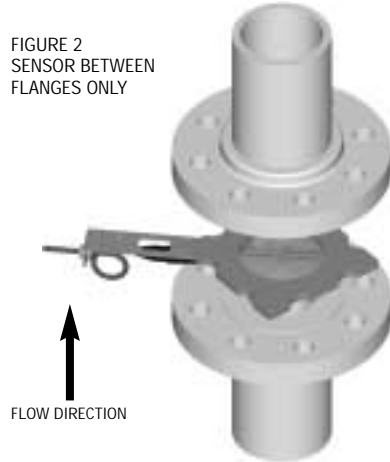
CAUTION: Un-even or under-torquing can cause leakage. Excessive torquing causes damage to the sensor and the related Rupture Disk Device.

CAUTION: Do not install additional companion flange gaskets.

Installation directly between Companion Flanges.

1. Insert sensor centrally between companion flanges in order that nameplate giving disk specification may be read easily. See Figure 2.
2. Ensure that LDAS+ and ALDAS+ sensors are installed in the correct direction.
3. Install studs with nuts. Studs and nuts should be free running with lightly oiled threads.

FIGURE 2
SENSOR BETWEEN
FLANGES ONLY



4. Tighten all nuts finger tight. Torque the nuts to the value shown in Table 1 or 2. Torque evenly in diagonal pattern by applying $\frac{1}{4}$ of the recommended torque to each stud. Repeat pattern by torquing to $\frac{1}{2}$ then $\frac{3}{4}$ of the recommended torque value. Then using the same pattern torque to full torque value.

NOTE: At process temperatures above 175° F (80 °C) the torque value should be checked and if necessary the stud nuts tightened to the correct torque value.

TEMPERATURE RANGE

Suitable for temperatures -40 °F (-40 °C) to 500 °F (260 °C) at the sensor location, 400°F (204°C) for the LDAS+ family

NOTE: For European CE marked Sensors, certification classification is dependent on the ambient temperature at the sensor location, ensure that the correct temperature classification has been ordered.

CAUTION: Do not locate cable on or near hot surfaces. Cable maximum temperature specification is:

Standard Cable: -22 °F (-30 °C) to 221 °F (105 °C).
High/Low Temperature cable: -85 °F (-65 °C) to 392 °F (200 °C)

ELECTRICAL SPECIFICATION

Maximum Current : 500 mA

Maximum Voltage : 24 VDC

Lower values shall be required where intrinsically safe conditions are to be maintained. Sensors are designed to function at a few microWatts of power.

European CE Marked Sensors

The rupture disk sensor is a 'simple electrical device' and is certified to comply with EN50014 and EN50020, 'Electrical Apparatus for Potentially Explosive Atmospheres', and the ATEX directive (94/9/EC) under the following codes:

EEx ia IIC T1 (-40 °C ≤ Tamb ≤ +260 °C)
 EEx ia IIC T2 (-40 °C ≤ Tamb ≤ +255 °C)
 EEx ia IIC T3 (-40 °C ≤ Tamb ≤ +155 °C)
 EEx ia IIC T4 (-40 °C ≤ Tamb ≤ +90 °C)
 EEx ia IIC T5 (-40 °C ≤ Tamb ≤ +55 °C)
 EEx ia IIC T6 (-40 °C ≤ Tamb ≤ +40 °C)

and  II 1 G/D

NOTE: All electrical equipment should be installed and maintained to a recognised national standard.

REPLACEMENT SENSORS

Do not attempt to repair damaged or burst sensors. Order replacement sensors by lot number which can be located on the sensor tag.

TABLE 1 Companion Flange Torque - ANSI Ratings

DISK SIZE		COMPANION FLANGE ANSI RATING	TORQUE	
IN	MM		NM	FT-LBS
2	50	150	57	42
		300	57	42
3	80	150	57	42
		300	102	75
4	100	150	57	42
		300	102	75
6	150	150	102	75
		300	102	75
8	200	150	102	75
		300	165	122
10	250	150	165	122
		300	248	183

MARKING

Each sensor is marked with the following information:

- Burst Sensor Type
- Sensor nominal size and corresponding pipe flange rating
- Lot number

In addition for European CE Marked Sensors, the following additional marking is applied to the sensor tag :

- CE mark and notified body number
- Electrical certification code markings
- Certificate number 'DNV-2003-OSL-ATEX-0005
- Warning of possible electrostatic risk
- Year of manufacture.

DISK SIZE		COMPANION FLANGE ANSI RATING	TORQUE	
IN	MM		NM	FT-LBS
12	300	150	165	122
		300	369	272
14	350	150	248	183
		300	369	272
16	400	150	248	183
		300	523	386
18	450	150	369	272
		300	523	286
20	500	150	369	272
		300	523	386
24	600	150	949	700
		300	523	386

TABLE 2 Companion Flange Torque - DIN/AFNOR/UNI Ratings

DISK SIZE		COMPANION FLANGE DIN/AFNOR/UNI RATING	TORQUE	
IN	MM		NM	FT-LBS
2	50	10/16/25/40	62	46
3	80	10/16/25/40	62	46
4	100	10/16	62	46
		25/40	122	90
6	150	10/16	122	90
		25/40	210	155
8	200	10	122	90
		16	122	90
		25	210	155
		40	312	230
10	250	10	122	90
		16	210	155
		25	312	230
		40	423	312
12	300	10	122	90
		16	210	155
		25	312	230
		40	423	312
14	350	10	122	90
		16	210	155
		25	423	312
		40	580	428

DISK SIZE		COMPANION FLANGE DIN/AFNOR/UNI RATING	TORQUE	
IN	MM		NM	FT-LBS
16	400	10	210	155
		16	312	230
		25	580	428
		40	650	480
18	450	10	210	155
		16	312	230
		25	N/A	N/A
		40	650	480
20	500	10	210	155
		16	423	312
		25	580	428
		40	813	600
24	600	10	312	230
		16	580	428
		25	650	480
		40	813	600
30	800	10	423	312
		16	650	480
		25	813	600
		40	881	650

The torque values in the tables above are suitable for use with studs of a minimum design stress of 25,000 psi as defined in ASME Section II Table 3. The companion flanges must be compatible for use with stud stresses up to 25,000 psi. Consult BS&B Safety Systems, L.L.C. or BS&B Safety Systems Ltd. for flanges in other materials when suppliers recommend torque values lower than the BS&B Safety Systems, L.L.C. or BS&B Safety Systems Ltd. recommended torque values and if gasket type differs from BS&B Safety Systems, L.L.C. or BS&B Safety Systems Ltd. recommendations.

The torque values in the tables above are based on the assumption of lightly oiled, clean, free running threads with a coefficient of friction of $\mu = 0.16 - 0.20$. The customer is advised that the effects of corrosion, the use of particular thread compounds or dry assembly, may result in a change in the effective clamp load on the disk assembly. This may adversely affect the performance of the disk.



ISO 9001
Quality System
Certification

Limitations of Warranties - BS&B Safety Systems, L.L.C. and BS&B Safety Systems Ltd. warrants their products, when properly installed, used and maintained by the original purchaser, against defective workmanship and materials for a period of twelve (12) months from the date of shipment. Purchaser's failure to use this product in strict compliance with all material operating specifications provided to BS&B Safety Systems, L.L.C. or BS&B Safety Systems Ltd. by purchaser prior to BS&B Safety Systems, L.L.C. or BS&B Safety Systems Ltd. production or shipment of this product shall void this warranty. Rupture disks are warranted solely to burst within specified pressure ranges at temperatures specified at the time of sale.

Where pressure relief or other products used by Buyer involve multi-part assemblies, each part must be manufactured by BS&B Safety Systems, L.L.C. or BS&B Safety Systems Ltd. BS&B Safety Systems, L.L.C. and BS&B Safety Systems Ltd. specifically disclaim any warranties and any and all liability for damages, either direct or indirect, incidental or consequential, arising from the use of rupture disk assemblies (e.g. rupture disk and rupture disk holder), explosion vent assemblies (e.g. vent and safety frame) or other assemblies not wholly comprised of BS&B Safety Systems, L.L.C. and BS&B Safety Systems Ltd. manufactured products.

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