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Continental Disc® Corporation

Preparation and Installation of the Sanitary BDI-FLX™ Sensor and Connection to the BDI-FLX Interface Cable

WARNING

USER SHOULD READ AND THOROUGHLY UNDERSTAND THESE INSTRUCTIONS BEFORE INSTALLING THE RUPTURE DISC, BDI-FLX BURST DISC SENSOR, AND INTERFACE CABLE. THESE INSTRUCTIONS DO NOT PURPORT TO ADDRESS ALL OF THE SAFETY FACTORS ASSOCIATED WITH THE RUPTURE DISC'S USE IN SERVICE. IT IS THE RESPONSIBILITY OF THE USER TO ESTABLISH APPROPRIATE SAFETY, HEALTH, AND TRAINING MEASURES FOR THEIR PERSONNEL INSTALLING, SERVICING, OR WORKING IN AN AREA WHERE RUPTURE DISC ASSEMBLIES ARE IN USE. SERVICE AND/OR MAINTENANCE ON OR AROUND THE RUPTURE DISC DEVICE MUST NOT BE PERFORMED WHILE THE DEVICE IS SUBJECTED TO OPERATING PRESSURES AND/OR TEMPERATURES.

IT IS THE USER'S SOLE RESPONSIBILITY FOR DESIGN AND PLACEMENT OF RUPTURE DISCS WITHIN THEIR FACILITY AND UPON THE EQUIPMENT UPON WHICH THE RUPTURE DISC OF USER'S SELECTION IS TO BE LOCATED. IT IS USER'S SOLE RESPONSIBILITY FOR THE DESIGN OF ADEQUATE VENTING AND INSTALLATION OF ADEQUATE VENT PIPING OR DIRECTIONAL FLOW AFTER RUPTURE OCCURS WITH THE RUPTURE DISC AS INTENDED. WHEN SIZE IS SPECIFIED, CONTINENTAL DISC CORPORATION ASSUMES THAT ADEQUATE PROVISIONS HAVE BEEN MADE BY PURCHASER FOR PROPER VENTING OF A SYSTEM TO RELIEVE THE SPECIFIC PRESSURE. LOCATE RUPTURE DISC WHERE PEOPLE OR PROPERTY WILL NOT BE EXPOSED TO THE SYSTEM DISCHARGE IN CASE OF RUPTURE. VENT TOXIC OR FLAMMABLE FUMES OR LIQUIDS TO A SAFE LOCATION TO PREVENT PERSONAL INJURY OR PROPERTY DAMAGE.

IT IS THE USER'S SOLE RESPONSIBILITY TO SPECIFY THE BURST PRESSURE RATING OF A RUPTURE DISC AT A COINCIDENT TEMPERATURE AT WHICH THE RUPTURE DISC IS TO BE USED. A RUPTURE DISC IS A TEMPERATURE SENSITIVE DEVICE. THE BURST PRESSURE OF THE RUPTURE DISC IS DIRECTLY AFFECTED BY ITS EXPOSURE TO THE COINCIDENT TEMPERATURE. GENERALLY, AS THE TEMPERATURE AT THE RUPTURE DISC INCREASES, THE BURST PRESSURE DECREASES; INVERSELY, AS THE TEMPERATURE AT THE RUPTURE DISC DECREASES, THE BURST PRESSURE MAY INCREASE. FAILURE TO PROPERLY UTILIZE A RUPTURE DISC AT THE SPECIFIED COINCIDENT TEMPERATURE COULD CAUSE PREMATURE FAILURE OR OVERPRESSURIZATION OF A SYSTEM.

THE INSTANTANEOUS RELEASE OF PRESSURE FROM THE RUPTURE DISC CAN CREATE VIOLENT NOISES DUE TO THE DISCHARGE AT SONIC VELOCITY. IT IS THE USER'S SOLE RESPONSIBILITY TO PROTECT AGAINST HEARING DAMAGE TO ANY BYSTANDERS.

RUPTURE DISCS AND TAGS ARE MADE OF METAL FOILS OF VARYING THICKNESS. THE METAL EDGES MAY BE SHARP. PERSONNEL INSTALLING OR EXAMINING THE RUPTURE DISCS SHOULD PROTECT AGAINST CUTS OR INJURY WHEN HANDLING THE RUPTURE DISC. DO NOT LIFT A RUPTURE DISC BY ITS ATTACHED TAG.

PARTICLES MAY BE DISCHARGED WHEN THE RUPTURE DISC RUPTURES. THESE PARTICLES MAY BE PART OF THE RUPTURE DISC ITSELF, OR OTHER ENVIRONMENTAL MATTER IN THE SYSTEM. IT IS THE USER'S SOLE RESPONSIBILITY TO ASSURE THAT THESE PARTICLES ARE DIRECTED TO A SAFE AREA TO PREVENT PERSONAL INJURY OR PROPERTY DAMAGE.

THERE IS NO GUARANTEE OF RUPTURE DISC LIFE. SUCH LIFE SPAN IS AFFECTED BY CORROSION, CREEP AND FATIGUE, AND PHYSICAL DAMAGE. THESE CONDITIONS WILL DERATE THE RUPTURE DISC TO A LOWER SET PRESSURE. THE CUSTOMER AND/OR USER SHOULD BE PREPARED TO HANDLE PREMATURE FAILURE OF THE RUPTURE DISC. THE MEDIA OR OTHER ENVIRONMENTAL CONDITIONS SHOULD NOT ALLOW ANY BUILDUP OR SOLIDIFICATION OF MEDIA TO OCCUR ON A RUPTURE DISC. THIS MAY INCREASE THE PRESSURE SETTING OF THE RUPTURE DISC.

CUSTOMER AND/OR ITS INSTALLER SHALL BE SOLELY RESPONSIBLE FOR THE PROPER INSTALLATION OF SELLER'S HOLDERS AND RUPTURE DISCS INTO A SYSTEM. CUSTOMER AND/OR ITS INSTALLER SHALL BE SOLELY RESPONSIBLE FOR IMPROPER INSTALLATION AND PHYSICAL DAMAGE RESULTING THEREFROM, INCLUDING BUT NOT LIMITED TO, DAMAGE RESULTING FROM LEAKAGE, IMPROPER TORQUING OR SEATING OF A RUPTURE DISC OR FAILURE TO FOLLOW INSTALLATION INSTRUCTIONS WHERE PROVIDED.

RUPTURE DISCS ARE PRECISION SAFETY DEVICES AND MUST BE INSTALLED PROPERLY. RUPTURE DISCS MUST BE INSTALLED BY TRAINED, KNOWLEDGEABLE INSTALLERS AND ONLY WITHIN ENVIRONMENTS SUITABLE AND APPROPRIATE FOR A RUPTURE DISC. CARE MUST BE USED IN A FACILITY'S DESIGN TO PROTECT BOTH THE RUPTURE DISC FROM INADVERTENT DAMAGE WHICH COULD CAUSE ITS PREMATURE RELEASE AND TO PROTECT INDIVIDUALS EXPOSED TO HAZARDS CREATED BY SUCH SUDDEN RELEASE.

PROPER INSTALLATION OF A RUPTURE DISC IS CRITICAL TO PERFORMANCE AND TO SAFETY. FAILURE TO PROVIDE PROPER SEATING OF A RUPTURE DISC MAY AFFECT RUPTURE DISC PERFORMANCE, BURST PRESSURE ACCURACY AND MAY RESULT IN ITS PREMATURE FAILURE.

I. Safety Precautions Before Installation

1. **WARNING: FOR FULL LIQUID APPLICATIONS: THE BDI-FLX SENSOR REQUIRES DYNAMIC MOVEMENT TO SIGNAL. SLOW REVERSAL OF THE RUPTURE DISC, SUCH AS WITH LIQUID THERMAL EXPANSION, WILL NOT CAUSE THE BDI-FLX SENSOR TO INDICATE. A SMALL CRACK IN A RUPTURE DISC SCORE WILL NOT CAUSE THE BDI-FLX SENSOR TO INDICATE. NOTE THAT THE BDI-FLX SENSOR IS DESIGNED TO INDICATE WITHIN A FEW MILLISECONDS, SO FULL REVERSAL AND FULL OPENING OF THE RUPTURE DISC MUST OCCUR WITHIN A FEW MILLISECONDS. IF FULL LIQUID FLOW AT SET PRESSURE OR A GAS HEAD WILL NOT BE PRESENT DURING RUPTURE OF DISC, CONTACT CDC FOR EVALUATION.**

2. **THE BDI-FLX SENSOR IS A PRECISION ELECTRICAL SENSOR. EVERY EFFORT SHOULD BE MADE NOT TO PRESS, FOLD, WRINKLE, TWIST, OR DO ANYTHING TO THE SENSOR THAT MIGHT DAMAGE IT.**

3. **THE BDI-FLX SENSOR IS DESIGNED TO OPERATE ONLY IN CONJUNCTION WITH THE BDI-FLX INTERFACE CABLE. DO NOT TRY TO OPERATE THE SENSOR WITHOUT THE BDI-FLX INTERFACE CABLE.**

4. See rupture disc and BDI-FLX Sensor tag to verify size, operating temperature, and all other operating parameters.

II. Preparation

1. Visually inspect the thin support membrane of the BDI-FLX sensor. The membrane is designed with a partially slit pattern. **DO NOT INSTALL THE SENSOR** if the membrane is broken.

2. Clean all foreign material from the assembly sealing area of both the Sanitary Fitting inlet and outlet.

III. Installation

For BDI-FLX Sensor Assembly WITHOUT Rupture Disc
(See Figure A)

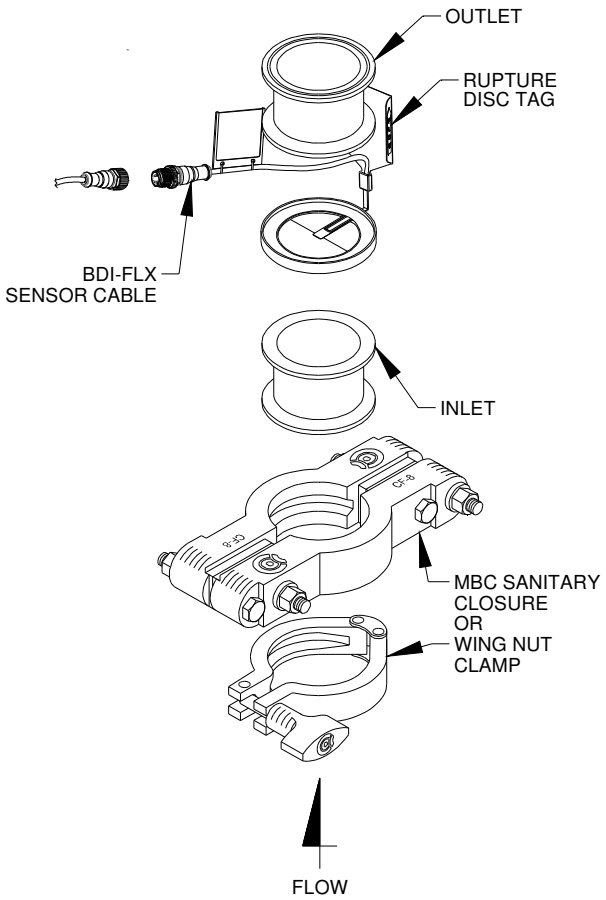
1. Minimum burst pressure based on full area relief devices of the same nominal tube size.

BDI-FLX Standard Offer	
Size Inches (mm)	Burst Pressure psig / (barg)
1 / (25)	25 / (1.72)
1-1/2 (40)	10 / (0.69)
2 / (50)	5 / (0.34)
3 / (80)	2 / (0.14)
4 / (100)	1 / (0.07)

2. The BDI-FLX sensor must be installed downstream of the rupture disc. Place the BDI-FLX sensor with the flow arrows pointing in the proper flow direction.

3. Secure the Sanitary BDI-FLX Sensor assembly with the appropriate size CDC MBC Sanitary Closure, wing nut clamp, or Tri-Clamp** 13 MHHM or equivalent. For the wing nut clamp, the hinge portion of the clamp must be positioned adjacent to the BDI-FLX tag. For the MBC Sanitary Closure, either side of the bolted portion of the clamp must be positioned adjacent to the BDI-FLX tag.

FIGURE 'A'



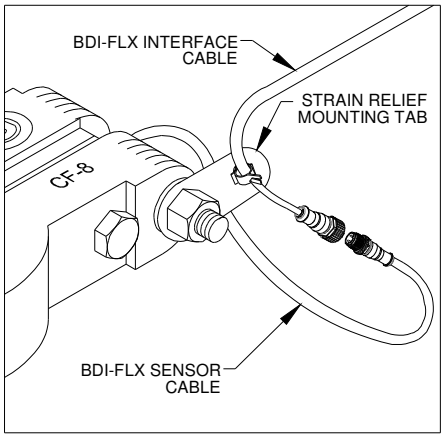
4. Installation of the strain relief mounting tab is necessary. Before tightening the clamp, install the strain relief mounting tab. Slide the mounting tab over the clamp stud as shown in **Figure B** and then torque as necessary. Insert the BDI-FLX interface cable into the stand-off clip.

5. If the wing nut clamp is used, torque the wing nut with a calibrated torque wrench to a recommended torque value of 30 In•Lbs / (3.4 N•m) using a 1-5/16" HEX SOCKET.

6. If the MBC Sanitary Closure is used (see **Figure C**), install free running bolts and nuts to finger tightness. Torque nuts number 1 and 2 with a calibrated torque wrench at 50% increments to a final torque of 20 Ft•Lbs / (27 N•m). For BDI-FLX sensor assemblies with integral rupture discs, depending on gasket material type and rupture disc material thickness, the torque compression may close the gap between the clamp halves. If it does not, maintain an equal and parallel gap between the clamp halves throughout the torque sequence. Torque nuts number 3 and 4 using the same criteria as nuts 1 and 2.

7. Secure the sensor cable with strain relief tab or cable tie.

Figure 'B'



For BDI-FLX Sensor On a Rupture Disc Assembly

1. Install the rupture disc and sensor assembly per provided rupture disc installation instruction.
2. Secure the lead wire with strain relief tab or cable tie.

IV. Connecting the BDI-FLX Sensor and BDI-FLX Interface Cable

WARNING: CONNECTING THE SENSOR AND INTERFACE CABLE SHOULD ONLY BE PERFORMED BY QUALIFIED PERSONNEL FOLLOWING THE LATEST EDITION OF THE GOVERNING ELECTRICAL CODE.

1. User should read carefully and understand the BDI-FLX Sensor System Operator's Manual before connecting the sensor and interface cable.

2. Verify that you are utilizing the correct BDI-FLX interface cable model for your installation:

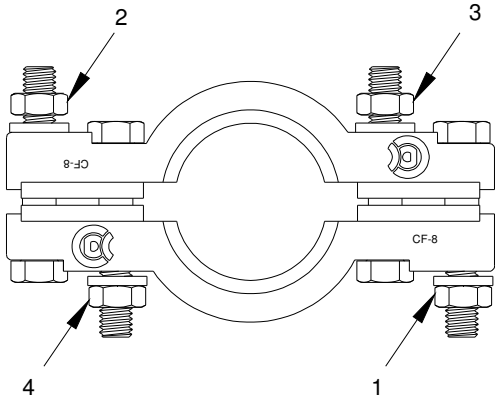
   Model 2W-IS: Two-Wire Output – Intrinsically Safe Design
   Model 2W-NIS: Two-Wire Output – Non Intrinsically Safe Design
   Model 4W-NIS: Four-Wire Output – Non Intrinsically Safe Design

3. Verify that power is off or the interface cable is not connected to a power supply.

4. Plug the BDI-FLX sensor M12 male connector into the corresponding BDI-FLX interface cable female connector and thread the screw ring to lock the connection.

5. Power on the device for operation.

FIGURE 'C'
EXAMPLE OF
BOLT TORQUE SEQUENCE



NOTE: POWER MUST BE OFF OR DISCONNECTED FROM THE INTERFACE CABLE BEFORE CONNECTING THE SENSOR. FAILURE TO DO SO WILL RESULT IN A FALSE SIGNAL.

V. Preventative Maintenance

1. Verify that the power is off and/or the interface cable is not connected to the power supply before disconnecting the sensor and interface cable for inspection or replacement.

2. Risk assessment and an annual rupture disc and BDI-FLX sensor replacement are recommended. Rupture disc service life is determined by system operating conditions. The effects of severe pressure/vacuum cycles, corrosion, temperature variations, or other adverse conditions must be evaluated by the user through actual service experience to determine optimal service life.

3. **IF THE RUPTURE DISC AND BDI-FLX SENSOR ARE NOT REPLACED PERIODICALLY WHEN EXPOSED TO THESE CONDITIONS, PREMATURE FAILURE OF THE RUPTURE DISC (THEREBY DISCHARGING THE PROCESS MEDIA) OR A FALSE SIGNAL OF THE SENSOR MAY OCCUR.**

4. To avoid extended downtime, maintain three spare rupture discs and BDI-FLX sensors in stock at all times for each holder in use. The number of spares required ultimately will be determined by service conditions.

VI. Customer Service

If you wish to discuss your application, installation, or maintenance, please contact the Customer Service Department at our headquarters location.

BDI-FLX SENSOR OPERATING DATA:

TEMPERATURE LIMITS:	-40 °F to + 400 °F (-40 °C to + 204 °C)
CONNECTOR RATING:	IP67
APPROVALS:	ATEX, IECEx, UL/cUL

Performance Under Pressure®

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