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BXF and BAF

Explosion-Proof Enclosure-Mounted / Intrinsically Safe Ethernet Couplers for use in MSHA approved Mining Machines or Systems

Installation & Operation Manual

OVERVIEW

The Solexy BXF explosion-proof enclosure-mounted and BAF intrinsically safe Ethernet couplers are integrated protection devices that facilitates Ethernet cabling installation in hazardous areas making the signal intrinsically safe. The patented (7,507,105) BXF and BAF coupler features a barrier circuit which protects the field cabling from faults or voltage and current high enough to cause a spark ignition. The BXF circuit is encapsulated and housed in an explosion-proof enclosure-mounted stainless steel body and is designed to be used with a MSHA certified enclosure for hazardous areas.

The BAF circuit is encapsulated and housed in an aluminum (T6061) housing and is designed to operate as an intrinsically safe barrier located in a safe/fresh air area. By utilizing the couplers with a MSHA certified enclosure, your system will be approved for hazardous area use with most PC's, Ethernet Switches, Hubs and Masters.

Note: The information in this manual is intended to assist with equipment design and ensure proper installation.

MSHA INTRINSIC SAFETY EVALUATION INFORMATION

MSHA File Number: 18-ISA140005-0

The BXF and BAF are accepted for use in an MSHA-approved mining machine or system. See applicable control drawing (below) for proper installation.

INSTALLATION

For proper installation, see the applicable control drawing (attached):

| Drawing | Coupler Description | Model |
|---------|---|-------|
| DC00052 | BXF Explosion-proof enclosure-mounted I.S. Ethernet barrier with 1-1/8-12 UNF thread | BXF |
| DC00061 | BAF I.S. Ethernet barrier for safe/fresh air area use with 3/4-14 NPT mounting thread | BAF |

1. Feed the CAT5 or higher rated cable through the enclosure conduit entry. **DO NOT attach to Ethernet source, switch, hub or master at this time!**
2. Screw coupler into enclosure following local electrical code (US MSHA requires 5 thread minimum engagement).
3. If part of the equipment is in a safe/fresh air area, then the circuit can be completed with the BAF series coupler. Make sure that proper grounding occurs per local codes.
4. Attach Ethernet connection to bus system at each end via BXF/BAF pigtail connector according to control drawings listed above.
5. Attach interconnecting cable between barriers per control drawings listed above.
6. For proper wiring and cable make up if not using a factory supplied cable, refer to drawing DC00063.

SPECIFICATIONS

| | |
|-------------------------------|----------------------|
| Ambient Temperature Range | -20°C to +60°C |
| Maximum Fault Voltage | 250 VAC - 48 VDC |
| Maximum Ethernet Power Output | 1 Watts |
| Maximum Current | 50 mA |
| Frequency Range | 10/100 MHz |
| DC Resistance (per conductor) | 41 Ω |
| Maximum (Total) Cable Length* | 100 meter (328 feet) |

* **Length may vary depending on bandwidth requirements and cable used (Example data vs. video)**

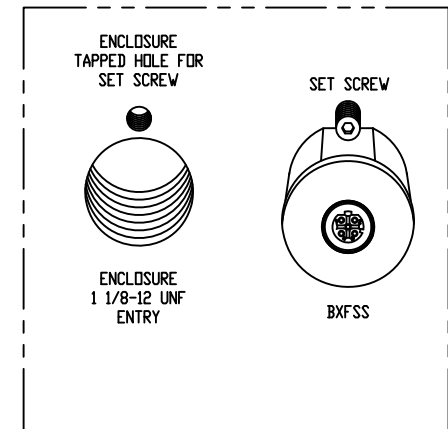
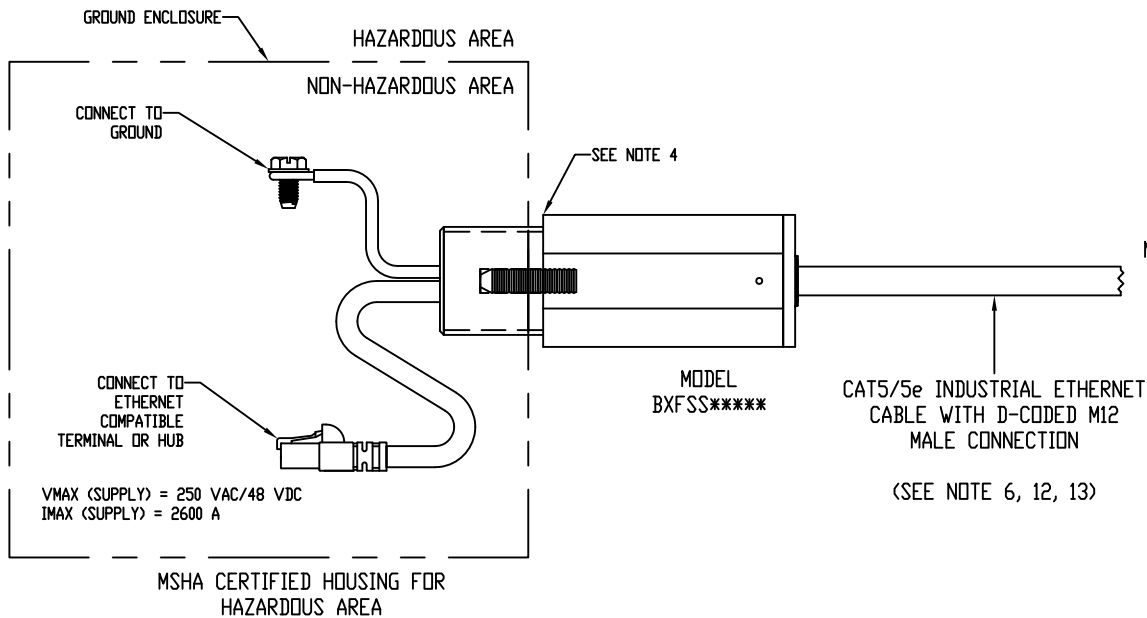
INSTALLATION REQUIREMENTS:

- The BXFSS must be securely mounted and grounded within an MSHA-certified explosion-proof enclosure. Both the housing and attached pigtail lead must be grounded.
- The Ethernet terminal or hub supply shall be a maximum of 250VAC or 48VDC, 2600A with a standard Ethernet output.
- The BXFSS shall be secured against loosening with set screw on MSHA certified explosion proof housing. Set screw is not supplied and should be per enclosure manufacturer's specifications.
- The BXFSS thread engagement with the MSHA certified explosion-proof enclosure shall be 1/2 inch penetration with minimum 5 thread engagement. Threads of enclosure must be 1 1/8-12 UNF.
- The installation shall preclude intermingling between all other circuits, wires and cables.
- Max cable length of 70m is from end termination to end termination of couplers, not length of cable between couplers. 10
- Only to be used with another BXF or BAF Ethernet coupler.
- Ambient operating temperature (Ta): -20°C to +60°C
- Terminal refers to any endpoint device such as a computer. Hub refers to any branching device such as a switch, router, etc.
- ANY CHANGE(S) IN THE INTRINSICALLY SAFE CIRCUITRY OR COMPONENTS MAY RESULT IN AN UNSAFE CONDITION.
- Refer to drawing DC00061 for BAF3A connections.
- Cable must meet TIA-568 requirements for CAT5/5e twisted-pair cable listed in "Cable Specifications" table. Cable must also have MSHA flame-rated jacket per Code of Federal Regulations Title 30, Part 7, Subpart K, Section 7.407 or be enclosed in MSHA rated flame resistant hose conduit.
- Cable shield must be grounded at both ends. 10

| CABLE SPECIFICATIONS | |
|---|----------------------------|
| Maximum Length | 70 m |
| Minimum Conductor Size | 24 AWG |
| No. Conductors | 2 pair or 4 pair CAT5e (1) |
| Maximum Operating Voltage | 300 VRMS |
| Maximum DC Resistance | 9.38 Ω / 100 m |
| Maximum Mutual Capacitance | 5.6 nF / 100 m |
| Maximum Unbalance Capacitance (pair to GND) | 330 pF / 100 m |
| Maximum Inductance | 56 μH / 100 m |



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| CABLE CONFIGURATION | |
|----------------------|------------|
| CONNECTIONS | CABLE TYPE |
| TERMINAL to HUB | STANDARD |
| TERMINAL to TERMINAL | CROSSOVER |
| HUB to HUB | CROSSOVER |



SECURE AGAINST LOOSENING WITH SET SCREW (NOT SUPPLIED) (SEE NOTE 3)

"DO NOT CHANGE WITHOUT APPROVAL OF MSHA"

| UNITS INCHES | SCALE INTS | DRAWN BY TEM | DATE 06/08/2010 |  | SHEET NO. 1 OF 1 |
|---|---------------------|---------------|-----------------|---|---|
|  | ANGLE OF PROJECTION | CHECK BY MEP | DATE 06/08/2010 | | TITLE CONTROL DRAWING - BXF EXPLOSION-PROOF ENCLOSURE MOUNTED ETHERNET COUPLER (MSHA) |
| UNLESS OTHERWISE SPECIFIED GENERAL TOLERANCES | | APPR'D BY MEP | DATE 06/08/2010 | MATERIAL N/A FINISH N/A CONCENTRICITY ±.005 ±.013 ANGLES ±0°30' | |
| .X | ±.020 ±.051 | | | | |
| .XX | ±.010 ±.025 | | | | |
| .XXX | ±.005 ±.013 | | | | |

| REV | DATE | ECN | DESCRIPTION | DRAWN BY | CHECK BY | APPR'D BY |
|-----|------------|-----|---|----------|----------|-----------|
| 10 | 11/14/2017 | N/A | Change max Ethernet cable length and grounding ends reference | SS | MEP | MEP |
| 09 | 04/04/2014 | N/A | Added "Enclosure Mounted" to drawing title. Removed illustration of sealing wire with crimp seal. Changed NOTE 3. Added illustration of set screw method of securing coupler. | TEM | MEP | MEP |

The design and disclosure contained in this drawing was originated by, and is the exclusive property of Solexy. It is furnished for information only and is not an authorization or license to make this construction or to furnish this information to others. All drawings must be returned to Solexy on demand. This drawing is not to be reproduced or copied in any form without the express written permission of Solexy.

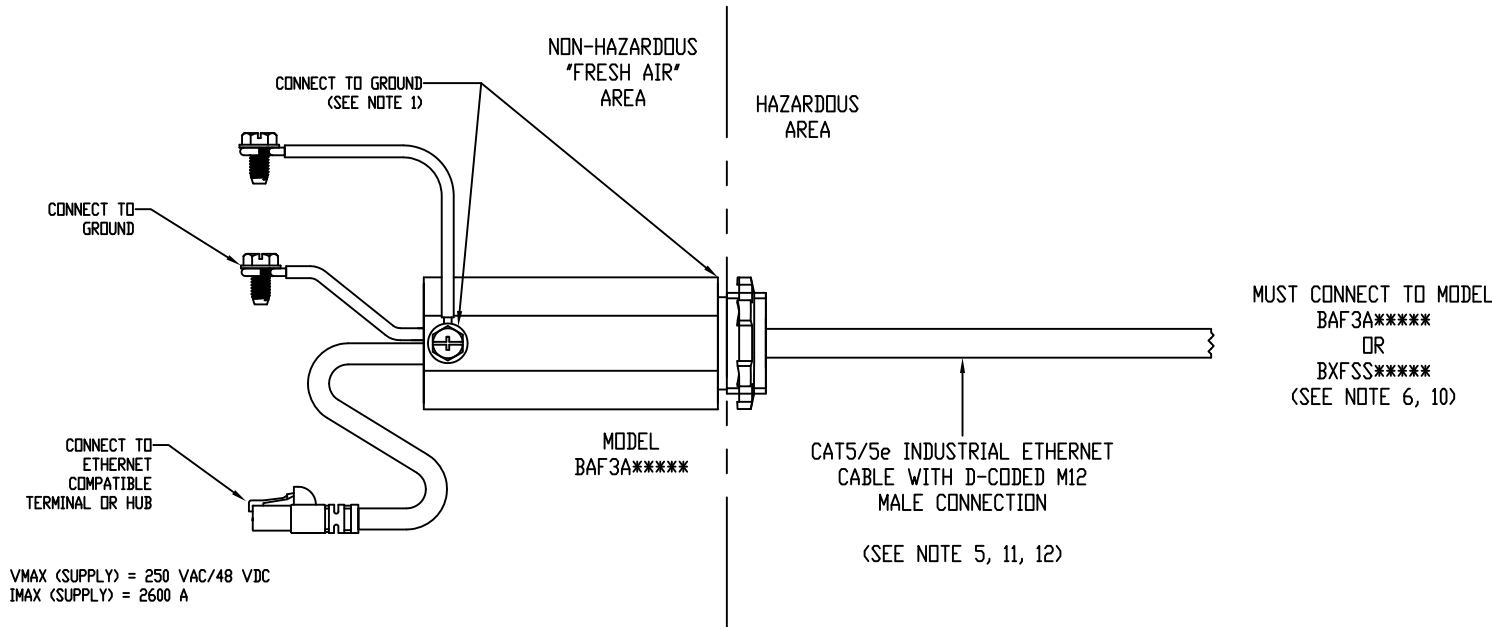
INSTALLATION REQUIREMENTS:

- In addition to the attached pigtail lead, the BAF3A must additionally be grounded via either the 3/4" NPT threaded connection or the supplied grounding screw. Secondary pigtail is supplied for connection to grounding screw.
- The Ethernet terminal or hub supply shall be a maximum of 250VAC or 48VDC, 2600A with a standard Ethernet output.
- Secure BAF3A with supplied panel nut or with bracket. Max wall thickness is 0.25 inch.
- The installation shall preclude intermingling between all other circuits, wires and cables.
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07

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| | | | | | | |
|---|---------------------|--|-----------------|---|--|--|
| UNITS INCHES | SCALE NTS | DRAWN BY TEM | DATE 06/11/2010 |  | SHEET NO. 1 OF 1 | |
|  | ANGLE OF PROJECTION | CHECK BY MEP | DATE 06/11/2010 | | TITLE CONTROL DRAWING - BAF INTRINSICALLY SAFE ETHERNET COUPLER (MSHA) | |
| UNLESS OTHERWISE SPECIFIED GENERAL TOLERANCES | | APPR'D BY MEP | DATE 06/11/2010 | MATERIAL N/A FINISH N/A | | SIZE A DRAWING NUMBER DC00061 REV 07 |
| .X | ±.020 ±0.51 | CONCENTRICITY ±.005 ±0.13 ANGLES ±0°30' | | The design and disclosure contained in this drawing was originated by, and is the exclusive property of Solexy. It is furnished for information only and is not an authorization or license to make this construction or to furnish this information to others. All drawings must be returned to Solexy on demand. This drawing is not to be reproduced or copied in any form without the express written permission of Solexy. | | |

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|-----|------------|-----|---|----------|----------|-----------|
| 07 | 11/14/2017 | N/A | Change max Ethernet cable length and grounding ends reference | SS | MEP | MEP |
| 06 | 08/26/2013 | N/A | Added IMAX of 2600 A in illustration and Note 2. Added Cable Specification table. Removed Note 5, changed all remaining note references. Added Note 11 and 12. Added reference to Note 6. Removed "Max Length" of cable from diagram. Added "Fresh Air" notation to non-hazardous area. | TEM | MEP | MEP |