



Certificate of Compliance

Certificate: 1284547

Master Contract: 159930

Project: 2147869

Date Issued: 2009/04/07

Issued to: **R. Stahl, Incorporated**
9001 Knight Rd
Houston, TX 77054
USA
Attention: Andreas Bagusch

The products listed below are eligible to bear the CSA Mark shown



Issued by: Donald Theroux

Authorized by: Patricia Pasemko, Operations
Manager

PRODUCTS

CLASS 2258 03 - PROCESS CONTROL EQUIPMENT - Intrinsically Safe and Non -
Incendive Systems - For Hazardous Locations

CLASS 2258 04 - PROCESS CONTROL EQUIPMENT - Intrinsically Safe, Entity - For
Hazardous Locations

Class I, Groups A, B, C and D; Class II, Groups E, F and G; Class III:

Zener Barrier Devices, Type 9001; provides intrinsically safe circuits with parameters as listed below, when connected per installation drawing 9001611312. These devices must be mounted in a suitable enclosure in non-hazardous locations or Class I, Div. 2, Group A,B,C,D hazardous locations. Maximum safe area voltage must not exceed 250Vrms.



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Type 9001/...

- e-280-091-141; with output System Parameters $V_{max} = 28.0 \text{ V}$, $R_{min} = 320 \text{ ohms}$; with output Entity Parameters $V_{max} = 28.1 \text{ V}$, $I_{sc} = 88.0 \text{ mA}$, $P_o = 637 \text{ mW}$.

- e-280-110-141; with output System Parameters $V_{max} = 28.0 \text{ V}$, $R_{min} = 267 \text{ ohms}$; with output Entity Parameters $V_{max} = 28.1 \text{ V}$, $I_{sc} = 106.0 \text{ mA}$, $P_o = 770 \text{ mW}$.

- a-050-050-101; with output System Parameters $V_{max} = 4.9 \text{ V}$, $R_{min} = 100 \text{ ohms}$; with output Entity Parameters $V_{max} = 4.9 \text{ V}$, $I_{sc} = 49.8 \text{ mA}$, $P_o = 62.5 \text{ mW}$.

- a-050-100-101; with output System Parameters $V_{max} = 4.9 \text{ V}$, $R_{min} = 56 \text{ ohms}$; with output Entity Parameters $V_{max} = 4.9 \text{ V}$, $I_{sc} = 92.8 \text{ mA}$, $P_o = 125 \text{ mW}$.

- a-050-150-101; with output System Parameters $V_{max} = 4.9 \text{ V}$, $R_{min} = 39 \text{ ohms}$; with output Entity Parameters $V_{max} = 4.9 \text{ V}$, $I_{sc} = 133.2 \text{ mA}$, $P_o = 187.5 \text{ mW}$.

- a-083-442-101; with output System Parameters $V_{max} = 8.4 \text{ V}$, $R_{min} = 22 \text{ ohms}$; with output Entity Parameters $V_{max} = 8.4 \text{ V}$, $I_{sc} = 442.0 \text{ mA}$, $P_o = 917.2 \text{ mW}$.

- a-086-010-101; with output System Parameters $V_{max} = 8.6 \text{ V}$, $R_{min} = 909 \text{ ohms}$; with output Entity Parameters $V_{max} = 8.6 \text{ V}$, $I_{sc} = 9.6 \text{ mA}$, $P_o = 21.5 \text{ mW}$.

- a-086-020-101; with output System Parameters $V_{max} = 8.6 \text{ V}$, $R_{min} = 475 \text{ ohms}$; with output Entity Parameters $V_{max} = 8.6 \text{ V}$, $I_{sc} = 18.3 \text{ mA}$, $P_o = 43 \text{ mW}$.

- a-086-050-101; with output System Parameters $V_{max} = 8.6 \text{ V}$, $R_{min} = 200 \text{ ohms}$; with output Entity Parameters $V_{max} = 8.6 \text{ V}$, $I_{sc} = 43.5 \text{ mA}$, $P_o = 107.5 \text{ mW}$.



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- a-086-075-101; with output System Parameters $V_{max} = 8.6 \text{ V}$, $R_{min} = 130 \text{ ohms}$; with output Entity Parameters $V_{max} = 8.6 \text{ V}$, $I_{sc} = 69.7 \text{ mA}$, $P_o = 161.3 \text{ mW}$.

- a-086-100-101; with output System Parameters $V_{max} = 8.6 \text{ V}$, $R_{min} = 91 \text{ ohms}$; with output Entity Parameters $V_{max} = 8.6 \text{ V}$, $I_{sc} = 99.6 \text{ mA}$, $P_o = 215 \text{ mW}$.

- a-086-150-101; with output System Parameters $V_{max} = 8.6 \text{ V}$, $R_{min} = 62 \text{ ohms}$; with output Entity Parameters $V_{max} = 8.6 \text{ V}$, $I_{sc} = 146.2 \text{ mA}$, $P_o = 322.5 \text{ mW}$.

- a-086-270-101; with output System Parameters $V_{max} = 8.6 \text{ V}$, $R_{min} = 36 \text{ ohms}$; with output Entity Parameters $V_{max} = 8.6 \text{ V}$, $I_{sc} = 251.8 \text{ mA}$, $P_o = 580.5 \text{ mW}$.

- a-086-390-101; with output System Parameters $V_{max} = 8.6 \text{ V}$, $R_{min} = 24 \text{ ohms}$; with output Entity Parameters $V_{max} = 8.6 \text{ V}$, $I_{sc} = 377.6 \text{ mA}$, $P_o = 838.5 \text{ mW}$.

- a-126-020-101; with output System Parameters $V_{max} = 12.6 \text{ V}$, $R_{min} = 681 \text{ ohms}$; with output Entity Parameters $V_{max} = 12.6 \text{ V}$, $I_{sc} = 18.7 \text{ mA}$, $P_o = 63 \text{ mW}$.

- a-126-050-101; with output System Parameters $V_{max} = 12.6 \text{ V}$, $R_{min} = 270 \text{ ohms}$; with output Entity Parameters $V_{max} = 12.6 \text{ V}$, $I_{sc} = 49.1 \text{ mA}$, $P_o = 157.5 \text{ mW}$.

- a-126-075-101; with output System Parameters $V_{max} = 12.6 \text{ V}$, $R_{min} = 180 \text{ ohms}$; with output Entity Parameters $V_{max} = 12.6 \text{ V}$, $I_{sc} = 73.7 \text{ mA}$, $P_o = 236.3 \text{ mW}$.

- a-126-100-101; with output System Parameters $V_{max} = 12.6 \text{ V}$, $R_{min} = 150 \text{ ohms}$; with output Entity Parameters $V_{max} = 12.6 \text{ V}$, $I_{sc} = 88.4 \text{ mA}$, $P_o = 315 \text{ mW}$.

- a-126-140-101; with output System Parameters $V_{max} = 12.6 \text{ V}$, $R_{min} = 100 \text{ ohms}$; with output Entity Parameters



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$V_{max} = 12.6 \text{ V}$, $I_{sc} = 132.6 \text{ mA}$, $P_o = 441 \text{ mW}$.

- a-126-150-101; with output System Parameters $V_{max} = 12.6 \text{ V}$, $R_{min} = 91 \text{ ohms}$; with output Entity Parameters $V_{max} = 12.6 \text{ V}$, $I_{sc} = 145.7 \text{ mA}$, $P_o = 472.5 \text{ mW}$.

- a-137-065-101; with output System Parameters $V_{max} = 13.6 \text{ V}$, $R_{min} = 220 \text{ ohms}$; with output Entity Parameters $V_{max} = 13.6 \text{ V}$, $I_{sc} = 65.3 \text{ mA}$, $P_o = 222.6 \text{ mW}$.

- a-158-005-101; with output System Parameters $V_{max} = 15.7 \text{ V}$, $R_{min} = 3240 \text{ ohms}$; with output Entity Parameters $V_{max} = 15.7 \text{ V}$, $I_{sc} = 4.9 \text{ mA}$, $P_o = 19.75 \text{ mW}$.

- a-158-150-101; with output System Parameters $V_{max} = 15.7 \text{ V}$, $R_{min} = 120 \text{ ohms}$; with output Entity Parameters $V_{max} = 15.7 \text{ V}$, $I_{sc} = 138.2 \text{ mA}$, $P_o = 592.5 \text{ mW}$.

- a-158-270-101; with output System Parameters $V_{max} = 15.7 \text{ V}$, $R_{min} = 62 \text{ ohms}$; with output Entity Parameters $V_{max} = 15.7 \text{ V}$, $I_{sc} = 267.1 \text{ mA}$, $P_o = 1067 \text{ mW}$.

- a-158-390-101; with output System Parameters $V_{max} = 15.7 \text{ V}$, $R_{min} = 43 \text{ ohms}$; with output Entity Parameters $V_{max} = 15.7 \text{ V}$, $I_{sc} = 386.8 \text{ mA}$, $P_o = 1541 \text{ mW}$.

- a-168-007-101; with output System Parameters $V_{max} = 16.8 \text{ V}$, $R_{min} = 2430 \text{ ohms}$; with output Entity Parameters $V_{max} = 16.8 \text{ V}$, $I_{sc} = 7.0 \text{ mA}$, $P_o = 29.4 \text{ mW}$.

- a-168-020-101; with output System Parameters $V_{max} = 16.8 \text{ V}$, $R_{min} = 909 \text{ ohms}$; with output Entity Parameters $V_{max} = 16.8 \text{ V}$, $I_{sc} = 18.7 \text{ mA}$, $P_o = 84 \text{ mW}$.

- a-168-050-101; with output System Parameters $V_{max} = 16.8 \text{ V}$, $R_{min} = 390 \text{ ohms}$; with output Entity Parameters $V_{max} = 16.8 \text{ V}$, $I_{sc} = 45.3 \text{ mA}$, $P_o = 210 \text{ mW}$.



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- a-168-075-101; with output System Parameters $V_{max} = 16.8 \text{ V}$, $R_{min} = 240 \text{ ohms}$; with output Entity Parameters $V_{max} = 16.8 \text{ V}$, $I_{sc} = 73.7 \text{ mA}$, $P_o = 315 \text{ mW}$.

- a-168-100-101; with output System Parameters $V_{max} = 16.8 \text{ V}$, $R_{min} = 180 \text{ ohms}$; with output Entity Parameters $V_{max} = 16.8 \text{ V}$, $I_{sc} = 98.2 \text{ mA}$, $P_o = 420 \text{ mW}$.

- a-199-010-101; with output System Parameters $V_{max} = 19.9 \text{ V}$, $R_{min} = 2210 \text{ ohms}$; with output Entity Parameters $V_{max} = 19.9 \text{ V}$, $I_{sc} = 9.1 \text{ mA}$, $P_o = 49.75 \text{ mW}$.

- a-199-020-101; with output System Parameters $V_{max} = 19.9 \text{ V}$, $R_{min} = 1210 \text{ ohms}$; with output Entity Parameters $V_{max} = 19.9 \text{ V}$, $I_{sc} = 16.6 \text{ mA}$, $P_o = 99.5 \text{ mW}$.

- a-199-038-101; with output System Parameters $V_{max} = 19.9 \text{ V}$, $R_{min} = 560 \text{ ohms}$; with output Entity Parameters $V_{max} = 19.9 \text{ V}$, $I_{sc} = 37.4 \text{ mA}$, $P_o = 189.1 \text{ mW}$.

- a-199-050-101; with output System Parameters $V_{max} = 19.9 \text{ V}$, $R_{min} = 430 \text{ ohms}$; with output Entity Parameters $V_{max} = 19.9 \text{ V}$, $I_{sc} = 48.7 \text{ mA}$, $P_o = 248.8 \text{ mW}$.

- a-199-070-101; with output System Parameters $V_{max} = 19.9 \text{ V}$, $R_{min} = 300 \text{ ohms}$; with output Entity Parameters $V_{max} = 19.9 \text{ V}$, $I_{sc} = 69.8 \text{ mA}$, $P_o = 348.3 \text{ mW}$.

- a-199-100-101; with output System Parameters $V_{max} = 19.9 \text{ V}$, $R_{min} = 220 \text{ ohms}$; with output Entity Parameters $V_{max} = 19.9 \text{ V}$, $I_{sc} = 95.2 \text{ mA}$, $P_o = 497.5 \text{ mW}$.

- a-199-150-101; with output System Parameters $V_{max} = 19.9 \text{ V}$, $R_{min} = 150 \text{ ohms}$; with output Entity Parameters $V_{max} = 19.9 \text{ V}$, $I_{sc} = 139.6 \text{ mA}$, $P_o = 746.3 \text{ mW}$.



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- a-199-270-101; with output System Parameters $V_{max} = 19.9 \text{ V}$, $R_{min} = 77.6 \text{ ohms}$; with output Entity Parameters $V_{max} = 19.9 \text{ V}$, $I_{sc} = 268.8 \text{ mA}$, $P_o = 1343 \text{ mW}$.

- 01-252-057-141; with output System Parameters $V_{max} = 25.2 \text{ V}$, $R_{min} = 470 \text{ ohms}$; with output Entity Parameters $V_{max} = 25.2 \text{ V}$, $I_{sc} = 56.4 \text{ mA}$, $P_o = 359.1 \text{ mW}$.

- 01-252-060-141; with output System Parameters $V_{max} = 25.2 \text{ V}$, $R_{min} = 470 \text{ ohms}$; with output Entity Parameters $V_{max} = 25.2 \text{ V}$, $I_{sc} = 56.4 \text{ mA}$, $P_o = 378 \text{ mW}$.

- a-252-070-101; with output System Parameters $V_{max} = 25.2 \text{ V}$, $R_{min} = 390 \text{ ohms}$; with output Entity Parameters $V_{max} = 25.2 \text{ V}$, $I_{sc} = 68.0 \text{ mA}$, $P_o = 441 \text{ mW}$.

- 01-252-100-141; with output System Parameters $V_{max} = 25.2 \text{ V}$, $R_{min} = 255 \text{ ohms}$; with output Entity Parameters $V_{max} = 25.2 \text{ V}$, $I_{sc} = 100.0 \text{ mA}$, $P_o = 630 \text{ mW}$.

- a-280-020-101; with output System Parameters $V_{max} = 28.0 \text{ V}$, $R_{min} = 1500 \text{ ohms}$; with output Entity Parameters $V_{max} = 28.0 \text{ V}$, $I_{sc} = 19.6 \text{ mA}$, $P_o = 140 \text{ mW}$.

- a-280-050-101; with output System Parameters $V_{max} = 28.0 \text{ V}$, $R_{min} = 620 \text{ ohms}$; with output Entity Parameters $V_{max} = 28.0 \text{ V}$, $I_{sc} = 47.5 \text{ mA}$, $P_o = 350 \text{ mW}$.

- a-280-075-101; with output System Parameters $V_{max} = 28.0 \text{ V}$, $R_{min} = 430 \text{ ohms}$; with output Entity Parameters $V_{max} = 28.0 \text{ V}$, $I_{sc} = 68.5 \text{ mA}$, $P_o = 525 \text{ mW}$.

- a-280-085-101; with output System Parameters $V_{max} = 28.0 \text{ V}$, $R_{min} = 349 \text{ ohms}$; with output Entity Parameters $V_{max} = 28.5 \text{ V}$, $I_{sc} = 77.0 \text{ mA}$, $P_o = 595 \text{ mW}$.

- a-280-100-101; with output System Parameters $V_{max} = 28.0 \text{ V}$, $R_{min} = 300 \text{ ohms}$; with output Entity Parameters



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$V_{max} = 28.5 \text{ V}$, $I_{sc} = 100.0 \text{ mA}$, $P_o = 700 \text{ mW}$.

- a-280-110-101; with output System Parameters $V_{max} = 28.0 \text{ V}$, $R_{min} = 270 \text{ ohms}$; with output Entity Parameters $V_{max} = 28.5 \text{ V}$, $I_{sc} = 111.0 \text{ mA}$, $P_o = 770 \text{ mW}$.

- a-315-020-101; with output System Parameters $V_{max} = 31.5 \text{ V}$, $R_{min} = 1800 \text{ ohms}$; with output Entity Parameters $V_{max} = 31.5 \text{ V}$, $I_{sc} = 18.4 \text{ mA}$, $P_o = 157.5 \text{ mW}$.

- a-315-050-101; with output System Parameters $V_{max} = 31.5 \text{ V}$, $R_{min} = 680 \text{ ohms}$; with output Entity Parameters $V_{max} = 31.5 \text{ V}$, $I_{sc} = 48.8 \text{ mA}$, $P_o = 393.8 \text{ mW}$.

- a-315-070-101; with output System Parameters $V_{max} = 31.5 \text{ V}$, $R_{min} = 510 \text{ ohms}$; with output Entity Parameters $V_{max} = 31.5 \text{ V}$, $I_{sc} = 65.0 \text{ mA}$, $P_o = 551.3 \text{ mW}$.

- a-398-020-101; with output System Parameters $V_{max} = 39.9 \text{ V}$, $R_{min} = 2200 \text{ ohms}$; with output Entity Parameters $V_{max} = 39.9 \text{ V}$, $I_{sc} = 19.1 \text{ mA}$, $P_o = 199 \text{ mW}$.

- a-398-050-101; with output System Parameters $V_{max} = 39.9 \text{ V}$, $R_{min} = 910 \text{ ohms}$; with output Entity Parameters $V_{max} = 39.9 \text{ V}$, $I_{sc} = 46.2 \text{ mA}$, $P_o = 497.5 \text{ mW}$.

- b-016-015-101; with output System Parameters $V_{max} = 1.64 \text{ V}$, $R_{min} = 121 \text{ ohms}$; with output Entity Parameters $V_{max} = 1.60 \text{ V}$, $I_{sc} = 17.0 \text{ mA}$, $P_o = 6 \text{ mW}$.

- b-016-050-101; with output System Parameters $V_{max} = 1.64 \text{ V}$, $R_{min} = 33.2 \text{ ohms}$; with output Entity Parameters $V_{max} = 1.60 \text{ V}$, $I_{sc} = 61.0 \text{ mA}$, $P_o = 20 \text{ mW}$.

- b-016-050-111; with output System Parameters $V_{max} = 1.64 \text{ V}$, $R_{min} = 33.2 \text{ ohms}$; with output Entity Parameters $V_{max} = 1.64 \text{ V}$, $I_{sc} = 49.9 \text{ mA}$, $P_o = 20 \text{ mW}$.



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- b-016-150-101; with output System Parameters $V_{max} = 1.64 \text{ V}$, $R_{min} = 12.1 \text{ ohms}$; with output Entity Parameters $V_{max} = 1.60 \text{ V}$, $I_{sc} = 167.0 \text{ mA}$, $P_o = 60 \text{ mW}$.

- b-016-150-111; with output System Parameters $V_{max} = 1.64 \text{ V}$, $R_{min} = 13 \text{ ohms}$; with output Entity Parameters $V_{max} = 1.60 \text{ V}$, $I_{sc} = 155.0 \text{ mA}$, $P_o = 60 \text{ mW}$.

- b-016-320-101; with output System Parameters $V_{max} = 1.64 \text{ V}$, $R_{min} = 5.6 \text{ ohms}$; with output Entity Parameters $V_{max} = 1.60 \text{ V}$, $I_{sc} = 376.0 \text{ mA}$, $P_o = 128 \text{ mW}$.

- b-061-020-101; with output System Parameters $V_{max} = 6.36 \text{ V}$, $R_{min} = 332 \text{ ohms}$; with output Entity Parameters $V_{max} = 6.2 \text{ V}$, $I_{sc} = 19.0 \text{ mA}$, $P_o = 30.5 \text{ mW}$.

- b-061-050-101; with output System Parameters $V_{max} = 6.36 \text{ V}$, $R_{min} = 130 \text{ ohms}$; with output Entity Parameters $V_{max} = 6.2 \text{ V}$, $I_{sc} = 49.0 \text{ mA}$, $P_o = 76.25 \text{ mW}$.

- b-061-150-101; with output System Parameters $V_{max} = 6.36 \text{ V}$, $R_{min} = 47 \text{ ohms}$; with output Entity Parameters $V_{max} = 6.2 \text{ V}$, $I_{sc} = 142.0 \text{ mA}$, $P_o = 228.8 \text{ mW}$.

- b-093-003-101; with output System Parameters $V_{max} = 9.6 \text{ V}$, $R_{min} = 3320 \text{ ohms}$; with output Entity Parameters $V_{max} = 9.4 \text{ V}$, $I_{sc} = 3.0 \text{ mA}$, $P_o = 6.975 \text{ mW}$.

- b-093-020-101; with output System Parameters $V_{max} = 9.6 \text{ V}$, $R_{min} = 511 \text{ ohms}$; with output Entity Parameters $V_{max} = 9.4 \text{ V}$, $I_{sc} = 19.0 \text{ mA}$, $P_o = 46.5 \text{ mW}$.

- b-093-030-101; with output System Parameters $V_{max} = 9.6 \text{ V}$, $R_{min} = 332 \text{ ohms}$; with output Entity Parameters $V_{max} = 9.4 \text{ V}$, $I_{sc} = 29.0 \text{ mA}$, $P_o = 69.75 \text{ mW}$.



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- b-093-050-101; with output System Parameters $V_{max} = 9.6 \text{ V}$, $R_{min} = 200 \text{ ohms}$; with output Entity Parameters $V_{max} = 9.4 \text{ V}$, $I_{sc} = 51.0 \text{ mA}$, $P_o = 116.3 \text{ mW}$.

- b-093-075-101; with output System Parameters $V_{max} = 9.6 \text{ V}$, $R_{min} = 150 \text{ ohms}$; with output Entity Parameters $V_{max} = 9.4 \text{ V}$, $I_{sc} = 67.0 \text{ mA}$, $P_o = 174.4 \text{ mW}$.

- b-093-100-101; with output System Parameters $V_{max} = 9.6 \text{ V}$, $R_{min} = 100 \text{ ohms}$; with output Entity Parameters $V_{max} = 9.4 \text{ V}$, $I_{sc} = 101.0 \text{ mA}$, $P_o = 232.5 \text{ mW}$.

- b-093-120-101; with output System Parameters $V_{max} = 9.6 \text{ V}$, $R_{min} = 82 \text{ ohms}$; with output Entity Parameters $V_{max} = 9.4 \text{ V}$, $I_{sc} = 123.0 \text{ mA}$, $P_o = 279 \text{ mW}$.

- b-093-150-101; with output System Parameters $V_{max} = 9.6 \text{ V}$, $R_{min} = 68 \text{ ohms}$; with output Entity Parameters $V_{max} = 9.4 \text{ V}$, $I_{sc} = 149.0 \text{ mA}$, $P_o = 348.8 \text{ mW}$.

- b-093-250-101; with output System Parameters $V_{max} = 9.6 \text{ V}$, $R_{min} = 43 \text{ ohms}$; with output Entity Parameters $V_{max} = 9.4 \text{ V}$, $I_{sc} = 235.0 \text{ mA}$, $P_o = 581.3 \text{ mW}$.

- b-093-270-101; with output System Parameters $V_{max} = 9.6 \text{ V}$, $R_{min} = 39 \text{ ohms}$; with output Entity Parameters $V_{max} = 9.4 \text{ V}$, $I_{sc} = 259.0 \text{ mA}$, $P_o = 627.8 \text{ mW}$.

- b-093-390-101; with output System Parameters $V_{max} = 9.6 \text{ V}$, $R_{min} = 27 \text{ ohms}$; with output Entity Parameters $V_{max} = 9.4 \text{ V}$, $I_{sc} = 374.0 \text{ mA}$, $P_o = 906.8 \text{ mW}$.

- b-133-003-101; with output System Parameters $V_{max} = 13.6 \text{ V}$, $R_{min} = 4750 \text{ ohms}$; with output Entity Parameters $V_{max} = 13.4 \text{ V}$, $I_{sc} = 3.0 \text{ mA}$, $P_o = 9.975 \text{ mW}$.

- b-133-020-101; with output System Parameters $V_{max} = 13.6 \text{ V}$, $R_{min} = 750 \text{ ohms}$; with output Entity Parameters



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$V_{max} = 13.4 \text{ V}$, $I_{sc} = 18.0 \text{ mA}$, $P_o = 66.5 \text{ mW}$.

- b-133-050-101; with output System Parameters $V_{max} = 13.6 \text{ V}$, $R_{min} = 300 \text{ ohms}$; with output Entity Parameters $V_{max} = 13.4 \text{ V}$, $I_{sc} = 48.0 \text{ mA}$, $P_o = 166.3 \text{ mW}$.

- b-133-075-101; with output System Parameters $V_{max} = 13.6 \text{ V}$, $R_{min} = 200 \text{ ohms}$; with output Entity Parameters $V_{max} = 13.4 \text{ V}$, $I_{sc} = 72.0 \text{ mA}$, $P_o = 249.4 \text{ mW}$.

- b-133-100-101; with output System Parameters $V_{max} = 13.6 \text{ V}$, $R_{min} = 150 \text{ ohms}$; with output Entity Parameters $V_{max} = 13.4 \text{ V}$, $I_{sc} = 95.0 \text{ mA}$, $P_o = 332.5 \text{ mW}$.

- b-133-120-101; with output System Parameters $V_{max} = 13.6 \text{ V}$, $R_{min} = 120 \text{ ohms}$; with output Entity Parameters $V_{max} = 13.4 \text{ V}$, $I_{sc} = 124.0 \text{ mA}$, $P_o = 399 \text{ mW}$.

- b-133-150-101; with output System Parameters $V_{max} = 13.6 \text{ V}$, $R_{min} = 100 \text{ ohms}$; with output Entity Parameters $V_{max} = 13.4 \text{ V}$, $I_{sc} = 143.0 \text{ mA}$, $P_o = 498.8 \text{ mW}$.

- b-172-270-101; with output System Parameters $V_{max} = 17.7 \text{ V}$, $R_{min} = 68 \text{ ohms}$; with output Entity Parameters $V_{max} = 17.4 \text{ V}$, $I_{sc} = 275.0 \text{ mA}$, $P_o = 1161 \text{ mW}$.

- b-172-390-101; with output System Parameters $V_{max} = 17.7 \text{ V}$, $R_{min} = 47.6 \text{ ohms}$; with output Entity Parameters $V_{max} = 17.4 \text{ V}$, $I_{sc} = 392.0 \text{ mA}$, $P_o = 1677 \text{ mW}$.

- b-175-020-101; with output System Parameters $V_{max} = 17.8 \text{ V}$, $R_{min} = 1000 \text{ ohms}$; with output Entity Parameters $V_{max} = 17.6 \text{ V}$, $I_{sc} = 18.0 \text{ mA}$, $P_o = 87.5 \text{ mW}$.

- b-175-050-101; with output System Parameters $V_{max} = 17.8 \text{ V}$, $R_{min} = 390 \text{ ohms}$; with output Entity Parameters $V_{max} = 17.6 \text{ V}$, $I_{sc} = 48.0 \text{ mA}$, $P_o = 218.8 \text{ mW}$.



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- b-175-075-101; with output System Parameters $V_{max} = 17.8 \text{ V}$, $R_{min} = 270 \text{ ohms}$; with output Entity Parameters $V_{max} = 17.6 \text{ V}$, $I_{sc} = 69.0 \text{ mA}$, $P_o = 328.1 \text{ mW}$.

- b-175-100-101; with output System Parameters $V_{max} = 17.8 \text{ V}$, $R_{min} = 200 \text{ ohms}$; with output Entity Parameters $V_{max} = 17.6 \text{ V}$, $I_{sc} = 94.0 \text{ mA}$, $P_o = 437.5 \text{ mW}$.

- b-175-120-101; with output System Parameters $V_{max} = 17.8 \text{ V}$, $R_{min} = 160 \text{ ohms}$; with output Entity Parameters $V_{max} = 17.6 \text{ V}$, $I_{sc} = 117.0 \text{ mA}$, $P_o = 525 \text{ mW}$.

- b-175-150-101; with output System Parameters $V_{max} = 17.8 \text{ V}$, $R_{min} = 130 \text{ ohms}$; with output Entity Parameters $V_{max} = 17.6 \text{ V}$, $I_{sc} = 144.0 \text{ mA}$, $P_o = 656.3 \text{ mW}$.

- b-175-200-101; with output System Parameters $V_{max} = 17.8 \text{ V}$, $R_{min} = 100 \text{ ohms}$; with output Entity Parameters $V_{max} = 17.6 \text{ V}$, $I_{sc} = 187.0 \text{ mA}$, $P_o = 875 \text{ mW}$.

- b-196-010-101; with output System Parameters $V_{max} = 20.2 \text{ V}$, $R_{min} = 2050 \text{ ohms}$; with output Entity Parameters $V_{max} = 19.8 \text{ V}$, $I_{sc} = 10.0 \text{ mA}$, $P_o = 49 \text{ mW}$.

- b-196-020-101; with output System Parameters $V_{max} = 20.2 \text{ V}$, $R_{min} = 1000 \text{ ohms}$; with output Entity Parameters $V_{max} = 19.8 \text{ V}$, $I_{sc} = 20.0 \text{ mA}$, $P_o = 98 \text{ mW}$.

- b-196-030-101; with output System Parameters $V_{max} = 20.2 \text{ V}$, $R_{min} = 750 \text{ ohms}$; with output Entity Parameters $V_{max} = 19.8 \text{ V}$, $I_{sc} = 28.0 \text{ mA}$, $P_o = 147 \text{ mW}$.

- b-196-050-101; with output System Parameters $V_{max} = 20.2 \text{ V}$, $R_{min} = 430 \text{ ohms}$; with output Entity Parameters $V_{max} = 19.8 \text{ V}$, $I_{sc} = 49.0 \text{ mA}$, $P_o = 245 \text{ mW}$.



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- b-196-075-101; with output System Parameters $V_{max} = 20.2 \text{ V}$, $R_{min} = 300 \text{ ohms}$; with output Entity Parameters $V_{max} = 19.8 \text{ V}$, $I_{sc} = 71.0 \text{ mA}$, $P_o = 367.5 \text{ mW}$.

- b-196-100-101; with output System Parameters $V_{max} = 20.2 \text{ V}$, $R_{min} = 220 \text{ ohms}$; with output Entity Parameters $V_{max} = 19.8 \text{ V}$, $I_{sc} = 97.0 \text{ mA}$, $P_o = 490 \text{ mW}$.

- b-196-120-101; with output System Parameters $V_{max} = 20.2 \text{ V}$, $R_{min} = 180 \text{ ohms}$; with output Entity Parameters $V_{max} = 19.8 \text{ V}$, $I_{sc} = 118.0 \text{ mA}$, $P_o = 588 \text{ mW}$.

- b-196-125-101; with output System Parameters $V_{max} = 20.2 \text{ V}$, $R_{min} = 180 \text{ ohms}$; with output Entity Parameters $V_{max} = 19.8 \text{ V}$, $I_{sc} = 118.0 \text{ mA}$, $P_o = 612.5 \text{ mW}$.

- b-196-150-101; with output System Parameters $V_{max} = 20.2 \text{ V}$, $R_{min} = 150 \text{ ohms}$; with output Entity Parameters $V_{max} = 19.8 \text{ V}$, $I_{sc} = 142.0 \text{ mA}$, $P_o = 735 \text{ mW}$.

- b-224-020-101; with output System Parameters $V_{max} = 23.0 \text{ V}$, $R_{min} = 1200 \text{ ohms}$; with output Entity Parameters $V_{max} = 22.6 \text{ V}$, $I_{sc} = 20.0 \text{ mA}$, $P_o = 112 \text{ mW}$.

- b-224-050-101; with output System Parameters $V_{max} = 23.0 \text{ V}$, $R_{min} = 510 \text{ ohms}$; with output Entity Parameters $V_{max} = 22.6 \text{ V}$, $I_{sc} = 47.0 \text{ mA}$, $P_o = 280 \text{ mW}$.

- b-224-075-101; with output System Parameters $V_{max} = 23.0 \text{ V}$, $R_{min} = 330 \text{ ohms}$; with output Entity Parameters $V_{max} = 22.6 \text{ V}$, $I_{sc} = 73.0 \text{ mA}$, $P_o = 420 \text{ mW}$.

- b-224-100-101; with output System Parameters $V_{max} = 23.0 \text{ V}$, $R_{min} = 240 \text{ ohms}$; with output Entity Parameters $V_{max} = 22.6 \text{ V}$, $I_{sc} = 101.0 \text{ mA}$, $P_o = 560 \text{ mW}$.

- b-224-120-101; with output System Parameters $V_{max} = 23.0 \text{ V}$, $R_{min} = 200 \text{ ohms}$; with output Entity Parameters



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$V_{max} = 22.6 \text{ V}$, $I_{sc} = 121.0 \text{ mA}$, $P_o = 672 \text{ mW}$.

- b-224-150-101; with output System Parameters $V_{max} = 23.0 \text{ V}$, $R_{min} = 160 \text{ ohms}$; with output Entity Parameters $V_{max} = 22.6 \text{ V}$, $I_{sc} = 151.0 \text{ mA}$, $P_o = 840 \text{ mW}$.

- b-280-015-101; with output System Parameters $V_{max} = 28.2 \text{ V}$, $R_{min} = 2200 \text{ ohms}$; with output Entity Parameters $V_{max} = 27.9 \text{ V}$, $I_{sc} = 14.0 \text{ mA}$, $P_o = 105 \text{ mW}$.

- b-280-020-101; with output System Parameters $V_{max} = 28.2 \text{ V}$, $R_{min} = 1600 \text{ ohms}$; with output Entity Parameters $V_{max} = 27.9 \text{ V}$, $I_{sc} = 19.0 \text{ mA}$, $P_o = 140 \text{ mW}$.

- b-280-050-101; with output System Parameters $V_{max} = 28.2 \text{ V}$, $R_{min} = 620 \text{ ohms}$; with output Entity Parameters $V_{max} = 27.9 \text{ V}$, $I_{sc} = 48.0 \text{ mA}$, $P_o = 350 \text{ mW}$.

- b-280-075-101; with output System Parameters $V_{max} = 28.2 \text{ V}$, $R_{min} = 430 \text{ ohms}$; with output Entity Parameters $V_{max} = 27.9 \text{ V}$, $I_{sc} = 69.0 \text{ mA}$, $P_o = 525 \text{ mW}$.

- b-280-090-101; with output System Parameters $V_{max} = 28.2 \text{ V}$, $R_{min} = 330 \text{ ohms}$; with output Entity Parameters $V_{max} = 27.9 \text{ V}$, $I_{sc} = 90.0 \text{ mA}$, $P_o = 630 \text{ mW}$.

- b-280-120-101; with output System Parameters $V_{max} = 28.2 \text{ V}$, $R_{min} = 270 \text{ ohms}$; with output Entity Parameters $V_{max} = 27.9 \text{ V}$, $I_{sc} = 110.0 \text{ mA}$, $P_o = 840 \text{ mW}$.

- b-307-075-101; with output System Parameters $V_{max} = 31.4 \text{ V}$, $R_{min} = 430 \text{ ohms}$; with output Entity Parameters $V_{max} = 31.0 \text{ V}$, $I_{sc} = 77.0 \text{ mA}$, $P_o = 575.6 \text{ mW}$.

- b-412-040-101; with output System Parameters $V_{max} = 41.8 \text{ V}$, $R_{min} = 1200 \text{ ohms}$; with output Entity Parameters $V_{max} = 41.4 \text{ V}$, $I_{sc} = 37.0 \text{ mA}$, $P_o = 412 \text{ mW}$.



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- c-086-000-101; with output System Parameters $V_{max} = 8.6 \text{ V}$, $R_{min} = *$ ohms; with output Entity Parameters $V_{max} = 28.5 \text{ V}$, $I_{sc} = 0 \text{ mA}$, $P_o = 0 \text{ mW}$.

- c-168-000-101; with output System Parameters $V_{max} = 16.5 \text{ V}$, $R_{min} = *$ ohms; with output Entity Parameters $V_{max} = 16.5 \text{ V}$, $I_{sc} = 0 \text{ mA}$, $P_o = 0 \text{ mW}$.

- c-199-000-101; with output System Parameters $V_{max} = 19.8 \text{ V}$, $R_{min} = *$ ohms; with output Entity Parameters $V_{max} = 19.8 \text{ V}$, $I_{sc} = 0 \text{ mA}$, $P_o = 0 \text{ mW}$.

- c-280-000-101; with output System Parameters $V_{max} = 28.0 \text{ V}$, $R_{min} = *$ ohms; with output Entity Parameters $V_{max} = 28.0 \text{ V}$, $I_{sc} = 0 \text{ mA}$, $P_o = 0 \text{ mW}$.

- d-086-150-101; with output System Parameters $V_{max} = 8.6 \text{ V}$, $R_{min} = 62 \text{ ohms}$; with output Entity Parameters $V_{max} = 8.6 \text{ V}$, $I_{sc} = 146.2 \text{ mA}$, $P_o = 322.5 \text{ mW}$.

- a-199-390-101#; with output System Parameters $V_{max} = 19.8 \text{ V}$, $R_{min} = 54.5 \text{ ohms}$; with output Entity Parameters $V_{max} = 19.8 \text{ V}$, $I_{sc} = 382.7 \text{ mA}$, $P_o = 1940 \text{ mW}$.

- a-280-165-101#; with output System Parameters $V_{max} = 28.0 \text{ V}$, $R_{min} = 180 \text{ ohms}$; with output Entity Parameters $V_{max} = 28.5 \text{ V}$, $I_{sc} = 163.7 \text{ mA}$, $P_o = 1155 \text{ mW}$.

- a-280-280-101#; with output System Parameters $V_{max} = 28.0 \text{ V}$, $R_{min} = 110 \text{ ohms}$; with output Entity Parameters $V_{max} = 28.5 \text{ V}$, $I_{sc} = 267.8 \text{ mA}$, $P_o = 1960 \text{ mW}$.

- b-217-270-101#; with output System Parameters $V_{max} = 21.8 \text{ V}$, $R_{min} = 85.7 \text{ ohms}$; with output Entity Parameters $V_{max} = 21.4 \text{ V}$, $I_{sc} = 268.1 \text{ mA}$, $P_o = 1465 \text{ mW}$.



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- b-217-390-101#; with output System Parameters $V_{max} = 21.8 \text{ V}$, $R_{min} = 60 \text{ ohms}$; with output Entity Parameters $V_{max} = 21.4 \text{ V}$, $I_{sc} = 383.0 \text{ mA}$, $P_o = 2116 \text{ mW}$.

- b-307-130-101#; with output System Parameters $V_{max} = 31.4 \text{ V}$, $R_{min} = 270 \text{ ohms}$; with output Entity Parameters $V_{max} = 31.4 \text{ V}$, $I_{sc} = 122.4 \text{ mA}$, $P_o = 997.8 \text{ mW}$.

- b-308-230-101#; with output System Parameters $V_{max} = 31.4 \text{ V}$, $R_{min} = 142 \text{ ohms}$; with output Entity Parameters $V_{max} = 31.0 \text{ V}$, $I_{sc} = 232.6 \text{ mA}$, $P_o = 1771 \text{ mW}$.

- b-412-065-101#; with output System Parameters $V_{max} = 41.8 \text{ V}$, $R_{min} = 680 \text{ ohms}$; with output Entity Parameters $V_{max} = 41.4 \text{ V}$, $I_{sc} = 64.7 \text{ mA}$, $P_o = 669.5 \text{ mW}$.

- b-412-095-101#; with output System Parameters $V_{max} = 41.8 \text{ V}$, $R_{min} = 470 \text{ ohms}$; with output Entity Parameters $V_{max} = 41.4 \text{ V}$, $I_{sc} = 93.6 \text{ mA}$, $P_o = 978.5 \text{ mW}$.

a = 00 for negative; 01 for positive polarity type

b = 02 for Nonpolarize (ac) type

c = 03 for positive; 04 for negative polarity EB type

d = 05 for negative; 06 for positive polarity MS type

e = 51

* designates diode return

designates I.S. outputs for Groups C,D,F,G only

Maximum barrier operating temperature is 60 deg. C except as follows:

T ambient = 50 deg. C:

- 9001/0.-280-165-101
- 9001/03-280-000-101



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-
- 9001/04-280-000-101
 - 9001/0.-280-280-101
 - 9001/51-280-091-141

T ambient = 40 deg. C:

- 9001/51-280-110-141

Note: For further details on Certification parameters, see Descriptive and Test Report.

CLASS 2258 04 - PROCESS CONTROL EQUIPMENT - Intrinsically Safe Entity – For Hazardous Locations

Ex nA [ia] IIC/IIB T4:

Zener Barrier Devices, Type 9001; provides intrinsically safe circuits with parameters as listed below, when connected per installation drawing 9001611312. These devices must be mounted in a suitable enclosure in non-hazardous locations or Class I, Zone 2, Group IIC hazardous locations. Maximum safe area voltage must not exceed 250Vrms.

Type 9001/...

a-050-050-101 ; with output Entity Parameters $U_o = 5 \text{ V}$, $I_o = 50 \text{ mA}$, $P_o = 62.5 \text{ mW}$.

a-050-100-101 ; with output Entity Parameters $U_o = 5 \text{ V}$, $I_o = 100 \text{ mA}$, $P_o = 125 \text{ mW}$.

a-050-150-101 ; with output Entity Parameters $U_o = 5 \text{ V}$, $I_o = 150 \text{ mA}$, $P_o = 187.5 \text{ mW}$.

a-083-442-101 ; with output Entity Parameters $U_o = 8.3 \text{ V}$, $I_o = 442 \text{ mA}$, $P_o = 917.2 \text{ mW}$.

a-086-010-101 ; with output Entity Parameters $U_o = 8.6 \text{ V}$, $I_o = 10 \text{ mA}$, $P_o = 21.5 \text{ mW}$.

a-086-020-101 ; with output Entity Parameters $U_o = 8.6 \text{ V}$, $I_o = 20 \text{ mA}$, $P_o = 43 \text{ mW}$.

a-086-050-101 ; with output Entity Parameters $U_o = 8.6 \text{ V}$, $I_o = 50 \text{ mA}$, $P_o = 107.5 \text{ mW}$.

a-086-075-101 ; with output Entity Parameters $U_o = 8.6 \text{ V}$, $I_o = 75 \text{ mA}$, $P_o = 161.3 \text{ mW}$.

a-086-100-101 ; with output Entity Parameters $U_o = 8.6 \text{ V}$, $I_o = 100 \text{ mA}$, $P_o = 215 \text{ mW}$.

a-086-150-101 ; with output Entity Parameters $U_o = 8.6 \text{ V}$, $I_o = 150 \text{ mA}$, $P_o = 322.5 \text{ mW}$.

a-086-270-101 ; with output Entity Parameters $U_o = 8.6 \text{ V}$, $I_o = 270 \text{ mA}$, $P_o = 580.5 \text{ mW}$.

a-086-390-101 ; with output Entity Parameters $U_o = 8.6 \text{ V}$, $I_o = 390 \text{ mA}$, $P_o = 838.5 \text{ mW}$.

a-126-020-101 ; with output Entity Parameters $U_o = 12.6 \text{ V}$, $I_o = 20 \text{ mA}$, $P_o = 63 \text{ mW}$.

a-126-050-101 ; with output Entity Parameters $U_o = 12.6 \text{ V}$, $I_o = 50 \text{ mA}$, $P_o = 157.5 \text{ mW}$.



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a-126-075-101 ; with output Entity Parameters $U_o = 12.6 \text{ V}$, $I_o = 75 \text{ mA}$, $P_o = 236.3 \text{ mW}$.

a-126-100-101 ; with output Entity Parameters $U_o = 12.6 \text{ V}$, $I_o = 100 \text{ mA}$, $P_o = 315 \text{ mW}$.

a-126-140-101 ; with output Entity Parameters $U_o = 12.6 \text{ V}$, $I_o = 140 \text{ mA}$, $P_o = 441 \text{ mW}$.

a-126-150-101 ; with output Entity Parameters $U_o = 12.6 \text{ V}$, $I_o = 150 \text{ mA}$, $P_o = 472.5 \text{ mW}$.

a-137-065-101 ; with output Entity Parameters $U_o = 13.7 \text{ V}$, $I_o = 65 \text{ mA}$, $P_o = 222.6 \text{ mW}$.

a-158-005-101 ; with output Entity Parameters $U_o = 15.8 \text{ V}$, $I_o = 5 \text{ mA}$, $P_o = 19.75 \text{ mW}$.

a-158-150-101 ; with output Entity Parameters $U_o = 15.8 \text{ V}$, $I_o = 150 \text{ mA}$, $P_o = 592.5 \text{ mW}$.

a-168-007-101 ; with output Entity Parameters $U_o = 16.8 \text{ V}$, $I_o = 7 \text{ mA}$, $P_o = 29.4 \text{ mW}$.

a-168-020-101 ; with output Entity Parameters $U_o = 16.8 \text{ V}$, $I_o = 20 \text{ mA}$, $P_o = 84 \text{ mW}$.

a-168-050-101 ; with output Entity Parameters $U_o = 16.8 \text{ V}$, $I_o = 50 \text{ mA}$, $P_o = 210 \text{ mW}$.

a-168-075-101 ; with output Entity Parameters $U_o = 16.8 \text{ V}$, $I_o = 75 \text{ mA}$, $P_o = 315 \text{ mW}$.

a-168-100-101 ; with output Entity Parameters $U_o = 16.8 \text{ V}$, $I_o = 100 \text{ mA}$, $P_o = 420 \text{ mW}$.

a-199-010-101 ; with output Entity Parameters $U_o = 19.9 \text{ V}$, $I_o = 10 \text{ mA}$, $P_o = 49.75 \text{ mW}$.

a-199-020-101 ; with output Entity Parameters $U_o = 19.9 \text{ V}$, $I_o = 20 \text{ mA}$, $P_o = 99.5 \text{ mW}$.

a-199-038-101 ; with output Entity Parameters $U_o = 19.9 \text{ V}$, $I_o = 38 \text{ mA}$, $P_o = 189.1 \text{ mW}$.

a-199-050-101 ; with output Entity Parameters $U_o = 19.9 \text{ V}$, $I_o = 50 \text{ mA}$, $P_o = 248.8 \text{ mW}$.

a-199-070-101 ; with output Entity Parameters $U_o = 19.9 \text{ V}$, $I_o = 70 \text{ mA}$, $P_o = 348.3 \text{ mW}$.

a-199-100-101 ; with output Entity Parameters $U_o = 19.9 \text{ V}$, $I_o = 100 \text{ mA}$, $P_o = 497.5 \text{ mW}$.

a-199-150-101 ; with output Entity Parameters $U_o = 19.9 \text{ V}$, $I_o = 150 \text{ mA}$, $P_o = 746.3 \text{ mW}$.

a-252-070-101 ; with output Entity Parameters $U_o = 25.2 \text{ V}$, $I_o = 70 \text{ mA}$, $P_o = 441 \text{ mW}$.

a-280-020-101 ; with output Entity Parameters $U_o = 28.0 \text{ V}$, $I_o = 20 \text{ mA}$, $P_o = 140 \text{ mW}$.

a-280-050-101 ; with output Entity Parameters $U_o = 28.0 \text{ V}$, $I_o = 50 \text{ mA}$, $P_o = 350 \text{ mW}$.

a-280-075-101 ; with output Entity Parameters $U_o = 28.0 \text{ V}$, $I_o = 75 \text{ mA}$, $P_o = 525 \text{ mW}$.

a-280-085-101 ; with output Entity Parameters $U_o = 28.0 \text{ V}$, $I_o = 85 \text{ mA}$, $P_o = 595 \text{ mW}$.



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- a-280-100-101 ; with output Entity Parameters $U_o = 28.0 \text{ V}$, $I_o = 100 \text{ mA}$, $P_o = 700 \text{ mW}$.
- a-280-110-101 ; with output Entity Parameters $U_o = 28.0 \text{ V}$, $I_o = 110 \text{ mA}$, $P_o = 770 \text{ mW}$.
- a-280-165-101# ; with output Entity Parameters $U_o = 28.0 \text{ V}$, $I_o = 165 \text{ mA}$, $P_o = 1155 \text{ mW}$.
- a-315-020-101 ; with output Entity Parameters $U_o = 31.5 \text{ V}$, $I_o = 20 \text{ mA}$, $P_o = 157.5 \text{ mW}$.
- a-315-050-101 ; with output Entity Parameters $U_o = 31.5 \text{ V}$, $I_o = 50 \text{ mA}$, $P_o = 393.8 \text{ mW}$.
- a-315-070-101 ; with output Entity Parameters $U_o = 31.5 \text{ V}$, $I_o = 70 \text{ mA}$, $P_o = 551.3 \text{ mW}$.
- a-398-020-101 ; with output Entity Parameters $U_o = 39.8 \text{ V}$, $I_o = 20 \text{ mA}$, $P_o = 199 \text{ mW}$.
- a-398-050-101 ; with output Entity Parameters $U_o = 39.8 \text{ V}$, $I_o = 50 \text{ mA}$, $P_o = 497.5 \text{ mW}$.
- 01-252-057-141 ; with output Entity Parameters $U_o = 25.2 \text{ V}$, $I_o = 57 \text{ mA}$, $P_o = 359.1 \text{ mW}$.
- 01-252-060-141 ; with output Entity Parameters $U_o = 25.2 \text{ V}$, $I_o = 60 \text{ mA}$, $P_o = 378 \text{ mW}$.
- 01-252-100-141 ; with output Entity Parameters $U_o = 25.2 \text{ V}$, $I_o = 100 \text{ mA}$, $P_o = 630 \text{ mW}$.
- b-016-015-101 ; with output Entity Parameters $U_o = 1.6 \text{ V}$, $I_o = 15 \text{ mA}$, $P_o = 6 \text{ mW}$.
- b-016-050-101 ; with output Entity Parameters $U_o = 1.6 \text{ V}$, $I_o = 50 \text{ mA}$, $P_o = 20 \text{ mW}$.
- b-016-050-111 ; with output Entity Parameters $U_o = 1.6 \text{ V}$, $I_o = 50 \text{ mA}$, $P_o = 20 \text{ mW}$.
- b-016-150-101 ; with output Entity Parameters $U_o = 1.6 \text{ V}$, $I_o = 150 \text{ mA}$, $P_o = 60 \text{ mW}$.
- b-016-150-111 ; with output Entity Parameters $U_o = 1.6 \text{ V}$, $I_o = 150 \text{ mA}$, $P_o = 60 \text{ mW}$.
- b-016-320-101 ; with output Entity Parameters $U_o = 1.6 \text{ V}$, $I_o = 320 \text{ mA}$, $P_o = 128 \text{ mW}$.
- b-061-020-101 ; with output Entity Parameters $U_o = 6.1 \text{ V}$, $I_o = 20 \text{ mA}$, $P_o = 30.5 \text{ mW}$.
- b-061-050-101 ; with output Entity Parameters $U_o = 6.1 \text{ V}$, $I_o = 50 \text{ mA}$, $P_o = 76.25 \text{ mW}$.
- b-061-150-101 ; with output Entity Parameters $U_o = 6.1 \text{ V}$, $I_o = 150 \text{ mA}$, $P_o = 228.8 \text{ mW}$.
- b-093-003-101 ; with output Entity Parameters $U_o = 9.3 \text{ V}$, $I_o = 3 \text{ mA}$, $P_o = 6.975 \text{ mW}$.
- b-093-020-101 ; with output Entity Parameters $U_o = 9.3 \text{ V}$, $I_o = 20 \text{ mA}$, $P_o = 46.5 \text{ mW}$.
- b-093-030-101 ; with output Entity Parameters $U_o = 9.3 \text{ V}$, $I_o = 30 \text{ mA}$, $P_o = 69.75 \text{ mW}$.
- b-093-050-101 ; with output Entity Parameters $U_o = 9.3 \text{ V}$, $I_o = 50 \text{ mA}$, $P_o = 116.3 \text{ mW}$.



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b-093-075-101 ; with output Entity Parameters $U_o = 9.3 \text{ V}$, $I_o = 75 \text{ mA}$, $P_o = 174.4 \text{ mW}$.

b-093-100-101 ; with output Entity Parameters $U_o = 9.3 \text{ V}$, $I_o = 100 \text{ mA}$, $P_o = 232.5 \text{ mW}$.

b-093-120-101 ; with output Entity Parameters $U_o = 9.3 \text{ V}$, $I_o = 120 \text{ mA}$, $P_o = 279 \text{ mW}$.

b-093-150-101 ; with output Entity Parameters $U_o = 9.3 \text{ V}$, $I_o = 150 \text{ mA}$, $P_o = 348.8 \text{ mW}$.

b-093-250-101 ; with output Entity Parameters $U_o = 9.3 \text{ V}$, $I_o = 250 \text{ mA}$, $P_o = 581.3 \text{ mW}$.

b-093-270-101 ; with output Entity Parameters $U_o = 9.3 \text{ V}$, $I_o = 270 \text{ mA}$, $P_o = 627.8 \text{ mW}$.

b-093-390-101 ; with output Entity Parameters $U_o = 9.3 \text{ V}$, $I_o = 390 \text{ mA}$, $P_o = 906.8 \text{ mW}$.

b-133-003-101 ; with output Entity Parameters $U_o = 13.3 \text{ V}$, $I_o = 3 \text{ mA}$, $P_o = 9.975 \text{ mW}$.

b-133-020-101 ; with output Entity Parameters $U_o = 13.3 \text{ V}$, $I_o = 20 \text{ mA}$, $P_o = 66.5 \text{ mW}$.

b-133-050-101 ; with output Entity Parameters $U_o = 13.3 \text{ V}$, $I_o = 50 \text{ mA}$, $P_o = 166.3 \text{ mW}$.

b-133-075-101 ; with output Entity Parameters $U_o = 13.3 \text{ V}$, $I_o = 75 \text{ mA}$, $P_o = 249.4 \text{ mW}$.

b-133-100-101 ; with output Entity Parameters $U_o = 13.3 \text{ V}$, $I_o = 100 \text{ mA}$, $P_o = 332.5 \text{ mW}$.

b-133-120-101 ; with output Entity Parameters $U_o = 13.3 \text{ V}$, $I_o = 120 \text{ mA}$, $P_o = 399 \text{ mW}$.

b-133-150-101 ; with output Entity Parameters $U_o = 13.3 \text{ V}$, $I_o = 150 \text{ mA}$, $P_o = 498.8 \text{ mW}$.

b-175-020-101 ; with output Entity Parameters $U_o = 17.5 \text{ V}$, $I_o = 20 \text{ mA}$, $P_o = 87.5 \text{ mW}$.

b-175-050-101 ; with output Entity Parameters $U_o = 17.5 \text{ V}$, $I_o = 50 \text{ mA}$, $P_o = 218.8 \text{ mW}$.

b-175-075-101 ; with output Entity Parameters $U_o = 17.5 \text{ V}$, $I_o = 75 \text{ mA}$, $P_o = 328.1 \text{ mW}$.

b-175-100-101 ; with output Entity Parameters $U_o = 17.5 \text{ V}$, $I_o = 100 \text{ mA}$, $P_o = 437.5 \text{ mW}$.

b-175-120-101 ; with output Entity Parameters $U_o = 17.5 \text{ V}$, $I_o = 120 \text{ mA}$, $P_o = 525 \text{ mW}$.

b-175-150-101 ; with output Entity Parameters $U_o = 17.5 \text{ V}$, $I_o = 150 \text{ mA}$, $P_o = 656.3 \text{ mW}$.

b-175-200-101 ; with output Entity Parameters $U_o = 17.5 \text{ V}$, $I_o = 200 \text{ mA}$, $P_o = 875 \text{ mW}$.

b-196-010-101 ; with output Entity Parameters $U_o = 19.6 \text{ V}$, $I_o = 10 \text{ mA}$, $P_o = 49 \text{ mW}$.

b-196-020-101 ; with output Entity Parameters $U_o = 19.6 \text{ V}$, $I_o = 20 \text{ mA}$, $P_o = 98 \text{ mW}$.

b-196-030-101 ; with output Entity Parameters $U_o = 19.6 \text{ V}$, $I_o = 30 \text{ mA}$, $P_o = 147 \text{ mW}$.



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b-196-050-101 ; with output Entity Parameters $U_o = 19.6 \text{ V}$, $I_o = 50 \text{ mA}$, $P_o = 245 \text{ mW}$.

b-196-075-101 ; with output Entity Parameters $U_o = 19.6 \text{ V}$, $I_o = 75 \text{ mA}$, $P_o = 367.5 \text{ mW}$.

b-196-100-101 ; with output Entity Parameters $U_o = 19.6 \text{ V}$, $I_o = 100 \text{ mA}$, $P_o = 490 \text{ mW}$.

b-196-120-101 ; with output Entity Parameters $U_o = 19.6 \text{ V}$, $I_o = 120 \text{ mA}$, $P_o = 588 \text{ mW}$.

b-196-125-101 ; with output Entity Parameters $U_o = 19.6 \text{ V}$, $I_o = 125 \text{ mA}$, $P_o = 612.5 \text{ mW}$.

b-196-150-101 ; with output Entity Parameters $U_o = 19.6 \text{ V}$, $I_o = 150 \text{ mA}$, $P_o = 735 \text{ mW}$.

b-224-020-101 ; with output Entity Parameters $U_o = 22.4 \text{ V}$, $I_o = 20 \text{ mA}$, $P_o = 112 \text{ mW}$.

b-224-050-101 ; with output Entity Parameters $U_o = 22.4 \text{ V}$, $I_o = 50 \text{ mA}$, $P_o = 280 \text{ mW}$.

b-224-075-101 ; with output Entity Parameters $U_o = 22.4 \text{ V}$, $I_o = 75 \text{ mA}$, $P_o = 420 \text{ mW}$.

b-224-100-101 ; with output Entity Parameters $U_o = 22.4 \text{ V}$, $I_o = 100 \text{ mA}$, $P_o = 560 \text{ mW}$.

b-224-120-101 ; with output Entity Parameters $U_o = 22.4 \text{ V}$, $I_o = 120 \text{ mA}$, $P_o = 672 \text{ mW}$.

b-224-150-101 ; with output Entity Parameters $U_o = 22.4 \text{ V}$, $I_o = 150 \text{ mA}$, $P_o = 840 \text{ mW}$.

b-280-015-101 ; with output Entity Parameters $U_o = 28.0 \text{ V}$, $I_o = 15 \text{ mA}$, $P_o = 105 \text{ mW}$.

b-280-020-101 ; with output Entity Parameters $U_o = 28.0 \text{ V}$, $I_o = 20 \text{ mA}$, $P_o = 140 \text{ mW}$.

b-280-050-101 ; with output Entity Parameters $U_o = 28.0 \text{ V}$, $I_o = 50 \text{ mA}$, $P_o = 350 \text{ mW}$.

b-280-075-101 ; with output Entity Parameters $U_o = 28.0 \text{ V}$, $I_o = 75 \text{ mA}$, $P_o = 525 \text{ mW}$.

b-280-090-101 ; with output Entity Parameters $U_o = 28.0 \text{ V}$, $I_o = 90 \text{ mA}$, $P_o = 630 \text{ mW}$.

b-280-120-101# ; with output Entity Parameters $U_o = 28.0 \text{ V}$, $I_o = 120 \text{ mA}$, $P_o = 840 \text{ mW}$.

b-307-075-101 ; with output Entity Parameters $U_o = 30.7 \text{ V}$, $I_o = 75 \text{ mA}$, $P_o = 575.6 \text{ mW}$.

b-307-130-101# ; with output Entity Parameters $U_o = 30.7 \text{ V}$, $I_o = 130 \text{ mA}$, $P_o = 997.8 \text{ mW}$.

b-412-040-101 ; with output Entity Parameters $U_o = 41.2 \text{ V}$, $I_o = 40 \text{ mA}$, $P_o = 412 \text{ mW}$.

b-412-065-101# ; with output Entity Parameters $U_o = 41.2 \text{ V}$, $I_o = 65 \text{ mA}$, $P_o = 669.5 \text{ mW}$.

b-412-095-101# ; with output Entity Parameters $U_o = 41.2 \text{ V}$, $I_o = 95 \text{ mA}$, $P_o = 978.5 \text{ mW}$.

c-086-000-101 ; with output Entity Parameters $U_o = 8.6 \text{ V}$, $I_o = 0 \text{ mA}$, $P_o = 0 \text{ mW}$.



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c-168-000-101 ; with output Entity Parameters $U_o = 16.8 \text{ V}$, $I_o = 0 \text{ mA}$, $P_o = 0 \text{ mW}$.

c-199-000-101 ; with output Entity Parameters $U_o = 19.9 \text{ V}$, $I_o = 0 \text{ mA}$, $P_o = 0 \text{ mW}$.

c-280-000-101 ; with output Entity Parameters $U_o = 28 \text{ V}$, $I_o = 0 \text{ mA}$, $P_o = 0 \text{ mW}$.

a-158-270-101 ; with output Entity Parameters $U_o = 15.8 \text{ V}$, $I_o = 270 \text{ mA}$, $P_o = 1067 \text{ mW}$.

a-158-390-101 ; with output Entity Parameters $U_o = 15.8 \text{ V}$, $I_o = 390 \text{ mA}$, $P_o = 1541 \text{ mW}$.

a-199-270-101 ; with output Entity Parameters $U_o = 19.9 \text{ V}$, $I_o = 270 \text{ mA}$, $P_o = 1343 \text{ mW}$.

a-199-390-101# ; with output Entity Parameters $U_o = 19.9 \text{ V}$, $I_o = 390 \text{ mA}$, $P_o = 1940 \text{ mW}$.

a-280-280-101# ; with output Entity Parameters $U_o = 28.0 \text{ V}$, $I_o = 280 \text{ mA}$, $P_o = 1960 \text{ mW}$.

b-172-270-101 ; with output Entity Parameters $U_o = 17.2 \text{ V}$, $I_o = 270 \text{ mA}$, $P_o = 1161 \text{ mW}$.

b-172-390-101 ; with output Entity Parameters $U_o = 17.2 \text{ V}$, $I_o = 390 \text{ mA}$, $P_o = 1677 \text{ mW}$.

b-217-270-101# ; with output Entity Parameters $U_o = 21.7 \text{ V}$, $I_o = 270 \text{ mA}$, $P_o = 1465 \text{ mW}$.

b-217-390-101# ; with output Entity Parameters $U_o = 21.7 \text{ V}$, $I_o = 390 \text{ mA}$, $P_o = 2116 \text{ mW}$.

b-308-230-101# ; with output Entity Parameters $U_o = 30.8 \text{ V}$, $I_o = 230 \text{ mA}$, $P_o = 1771 \text{ mW}$.

e-280-091-141 ; with output Entity Parameters $U_o = 28 \text{ V}$, $I_o = 91 \text{ mA}$, $P_o = 637 \text{ mW}$.

e-280-110-141 ; with output Entity Parameters $U_o = 28 \text{ V}$, $I_o = 110 \text{ mA}$, $P_o = 770 \text{ mW}$.

d-086-150-101 ; with output Entity Parameters $U_o = 8.6 \text{ V}$, $I_o = 150 \text{ mA}$, $P_o = 322.5 \text{ mW}$.

a = 00 for negative; 01 for positive polarity type

b = 02 for Nonpolarize (ac) type

c = 03 for positive; 04 for negative polarity EB type

d = 05 for negative; 06 for positive polarity MS type

e = 51

* designates diode return

designates I.S. outputs for Groups IIB/IIA only



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Maximum barrier operating temperature is 60 deg. C except as follows:

T ambient = 50 deg. C:

- 9001/0.-280-165-101
- 9001/03-280-000-101
- 9001/04-280-000-101
- 9001/0.-280-280-101
- 9001/51-280-091-141

T ambient = 40 deg. C:

- 9001/51-280-110-141

Note: For further details on Certification parameters, see Descriptive and Test Report.

APPLICABLE REQUIREMENTS

CAN/CSA-60079-0:07 - Electrical Apparatus for Explosive Gas Atmospheres - Part 0: General Requirements

CAN/CSA-E60079-11:02 (Reaffirmed 2006) - Electrical apparatus for explosive gas atmospheres - Part 11: Intrinsic safety "i"

CAN/CSA-E60079-15:02 (Reaffirmed 2006) - Electrical apparatus for explosive gas atmospheres - Part 15: Electrical apparatus with type of protection "n"

CSA Std C22.2 No. 213-M1987 (Reaffirmed 2008) - Non-incendive Electrical Equipment for use in Class I, Division 2 Hazardous Locations

CAN/CSA- No. 157-92 (Including update No. 2, June, 2003) - Intrinsically Safe and Non-incendive Electrical Equipment for Use in Hazardous Locations



Supplement to Certificate of Compliance

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The products listed, including the latest revision described below, are eligible to be marked in accordance with the referenced Certificate.

Product Certification History

Project	Date	Description
2147869	2009/04/07	Update of Report 1284547 to reflect changes to drawings and resistor changes for 9001 Zener barriers.
1632719	2005/01/21	Update of report 1284547 to cover correction to Po rating for Model 9001/a-137-065-101

History

1284547 October 1, 2002 Original Certification.