



Compiled/Updated	ZB
Approved	CD
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Amendment	A5

Product Data Sheet - LINEZEBRA

Helps prevent bird collisions with transmission and distribution power lines + provides a visual warning for plant and equipment working near power lines.

Key Features:

- When installing from the ground, a special quick release tool can be attached to industry standard telescopic hot sticks, for fast and efficient installation and removal from line.
- Compatible with Shotgun sticks.
- Lab based slip tests prove better performance than alternate products on the market.
- Duration tested to 160kph.
- Fatigue tested to over 5 million cycles.
- OPGW vibration tested to 10 million cycles.
- High internal contrast with independent fingers or streamers that flutter with a breeze.
- Glow in dark performance on certain models for low light visibility
- High-vis reflectors.
- Range taking clamp fits most powerline conductors.
- Installable via drone (coming soon).

Figure 1 BD-SC-1Z-BW-BE

Suitable for powerline warning for birds



Figure 2 BD-SC-1Z-BGID-BE

Improved powerline warning for birds during day and night



Figure 3 BD-SC-1Z-OW-BE

Suitable for powerline warning around construction sites



Figure 4 BD-SC-1Z-OGID-BE

Improved powerline warning around construction sites during day and night



Figure 5 BD-SC-1Z-RW-BE

Red & white colour pattern associated with aviation warning





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Part No. Table (A)

Part No.	Description
BD-SC-1Z-BW-BE	LINEZEBRA Spring Clamp with 2 Black and 4 White Streamers BE version
BD-SC-1Z-BGID-BE	LINEZEBRA Spring Clamp with 2 Black and 4 Glow in Dark Streamers BE version*
BD-SC-1Z-OW-BE	LINEZEBRA Spring Clamp with 4 Orange and 2 White Streamers BE version
BD-SC-1Z-OGID-BE	LINEZEBRA Spring Clamp with 4 Orange and 2 Glow in Dark Streamers BE version*
BD-SC-1Z-RW-BE	LINEZEBRA Spring Clamp with 4 Red and 2 White Streamers BE version

* The glow in dark flapper contains fluorescent pigment which will emit a glow-in-the-dark light after dusk.

** Other colour streamers are available based on the requested MOQ.

Dimensions Table (B)

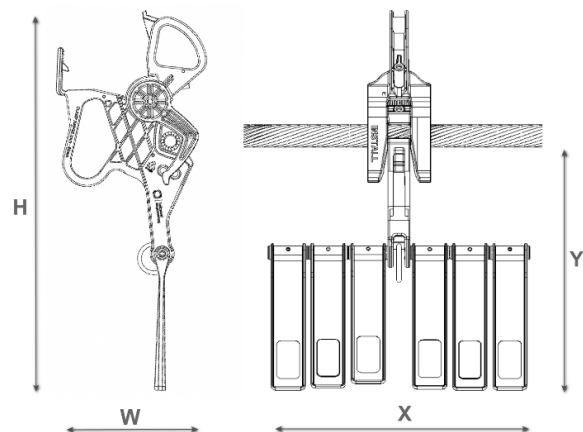
X	Y	W	H	Clamp Closes To*	Clamp Opens To*	Weight
230mm	250mm	170mm	400mm	2mm	50mm	390 g
X = The width of the Streamers Y = Drop from conductor when installed as depicted adjacent						

*Suitability of the conductor is subject to the engineering requirements of the asset owner.

Note: Any dimensions or weights figures are estimates only.

Materials Table (C)

Components	Material
Clamps, Streamers	UV Nylon 6, V-2 Grade
Cylinder	UV Nylon, V-0 Grade
Soft Jaws	UV TPE, V-0 Grade
Hinge Pin	Brass
Tension Spring, Spring Pin, Streamer Tube and O-Ring	Stainless Steel
Reflector*	3M Diamond Grade Reflective Sheeting



* Please note only 4 reflectors are attached per unit.



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Spacing

The general recommendation is to space the devices 5 meters to 10 metres apart, please refer to our LINEZEBRA Instruction Sheet for more detailed information. This recommendation is subject to the requirements of the asset owner and dependent on environmental conditions and the specific application.

Ratings Table (D)

1	Salt spray corrosion test ISO 9227, ISO 10289	Brass = 7 - 8 ^(a) Stainless Steel = 10 ^(a)	2	Slip test (load when device started to slip) IEC 61897-2020 test method	145 N ^(b)
3	Testing of clamp assembly on 120°C heated rod for 1h	No adverse functional effect on unit ^(c)	4	Reflectors Colour and Retro Reflectivity	ASTM D4956 Type XI, AS/NZS 1906.1 Class 1W, DTMR QLD Class 1X, RTA NSW Class 1X ^(d)
5	Testing of clamp assembly to -35°C IEEE 1656-2010	No adverse functional effect on unit ^(e)	6	Wind Tunnel testing at a maximum of 45m/s (162kph) in accordance with standardised testing protocols	No adverse functional effect on unit ^(f)
7	Max. projected area of the unit in a single plane	~35,096mm ²	8	Max. horizontal visible area of reflective element surface area	~1454.5mm ²
9	Coefficient of drag	1.17 ^(g)	10	Line load (per unit) At wind speed of 0kph At wind speed of 18kph At wind speed of 36kph At wind speed of 108kph	3.82 N (390g) ^(g) 3.87 N (395g) ^(g) 4.58 N (467g) ^(g) 9.75 N (994g) ^(g)



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11	UV aging test of Clamps (same material of Streamers) 1000 hours ISO 4892-3, ASTM D 638, ISO 4582	Changes in colour (Colour Fastness Grading): 4 Changes in other appearance properties: Slight	12	Ozone resistance of Clamps and Streamers Material 1000 hours	No visual signs of damage ^(h)
13	Michelson contrast (BD-SC-1Z-BW)	≈ 0.991 ⁽ⁱ⁾	14	Streamers swing fatigue test over 5 million cycles	No adverse functional effect on unit ⁽ⁱ⁾
15	Ice loading effect on 22mm conductor EN 50341-2-4:2016	0.65% increase at 10m spacing ⁽ⁱ⁾	16	OPGW vibration test IEC 60794-1-21 test method	Tested up to 10,000,000 cycles No adverse functional effect on OPGW ^(j)
17	Phosphorescent pigment decay time DIN 67510-1:2009	Over 16 hours ^(k)	18		

(a) Results obtained from standardised third-party test lab tests performed on the same metallic components of BIRDFLAPPA and FLAGMARKA.

(b) Results obtained from standardised third-party test lab tests performed on the same Spring Clamp of BIRDFLAPPA and FLAGMARKA, tested on Ø21.6mm OD ASCR conductor.

(c) Results obtained from Balmoral inhouse tests performed on the same Spring Clamp of FLAGMARKA.

(d) Results obtained from the 3M Reflective Sheeting Datasheet. Same series of sheeting specimens passed ASTM E162 Flame Spread test.

(e) Results obtained from standardised third-party test lab tests performed on the same Spring Clamp of BIRDFLAPPA and FLAGMARKA.

(f) Results obtained from the device performance conducted in a leading Australian University Wind Tunnel Test lab.

(g) The Line load is inclusive of the device weight; it's calculated based on the given Coefficient of Drag and the maximum projected area of the device at different wind speed. The actual value may vary depending on the state of the device at different wind speeds.

(h) Results obtained from standardised indoor lab tests performed on the material specimens.

(i) Results obtained from Balmoral inhouse test or theoretical calculation.

(j) Results obtained from Balmoral inhouse test referring to the IEC 60794-1-21 E19 test method but simplified the testing process.

(k) Results obtained from the phosphorescent pigment manufacturer lab test.

The data herein is an indication of product capabilities in known predetermined lab conditions and actual outdoor environments may vary.

Where stated, "unit" refers to a LINEZEBRA device.

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