



Babcock International Group



P10101  
400kV TD Beaully – Denny Route  
New Overhead Line  
Bird Flight Diverter Schedule  
48 Fibre OPGW (Keziah) Earthwire  
Drawing No. P10101/3105  
Pages 1 – 13 inclusive

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## **1 Introduction**

Scottish Power (SP) intends to construct a new 400/275/132 kV substation at Denny as part of a planned program of reinforcement and in order to connect the new Beauly – Denny 400/275kV overhead transmission line. This will affect ZD, ZG, CN, ZC(N), ZC(S), AB routes including the establishment of the new 400kV TD route.

The new TD route will run at 400kV from TD192A/1A to TD248A at Denny S/S on L12X (modified L12) towers using 2x700 mm<sup>2</sup> Araucaria AAAC. The route length is approximately 19.8 km.

SP have stipulated that Bird Flight Diversers are to be fitted to the new 48 Fibre OPGW (Keziah) earthwire in 23 spans, TD 206C – TD214A and TD222 – TD236.

This document is to outline the installation procedure and quantity of Bird Flight Diversers required for the TD overhead line route.



## **2 Installation Requirements**

- Bird Flight Diversers are to be installed at 5m intervals along the OPGW earthwire in each span. (Refer to SP Document No. 17VX-1-0000-IO-IBECDE-0002. Section 7.1.6 – Conductoring).



### 3 References

- Balfour Beatty Document No. BK/PTD/6054/1436 Rev. A – L12X Bird Flight Diverter Study.
- Preformed Line Products (GB) Ltd: Application for Bird Flight Diverter – Double Leg.
- Scottish Power Document No. 17VX-1-0000-IO-IBECDE-0002 – Beauly – Denny. 132/275/400kV Works, associated with the construction of Denny Sub Station. Part 1 – Technical Specification.

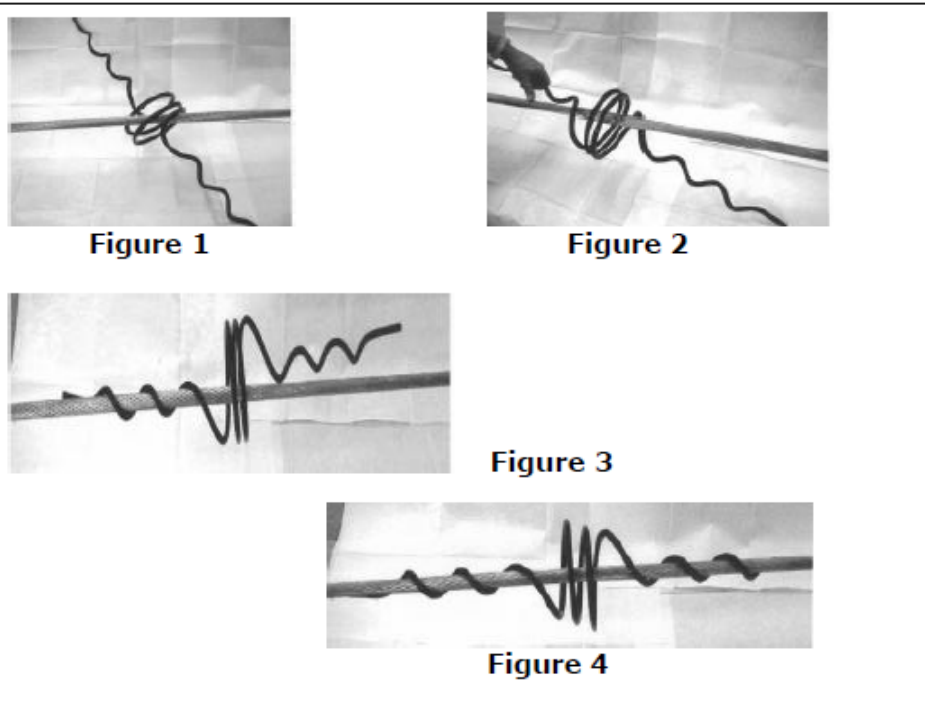


#### **4 Appendix A: Application Instructions**

Note: Manufacturer data may differ according to which is contracted to the works. The following details from PLP are for information purposes only and not for construction.

APPLICATION **APPLICATION** APPLICATION

**BIRD FLIGHT DIVERTER – DOUBLE LEG**



**APPLICATION INSTRUCTIONS**

- Place centre coils over conductor in Figure 1 and rotate anti-clockwise until conductor passes through all centre coils as in Figure 2.
- Wrap left hand gripping helix over conductor as in Figure 3.
- Repeat with right hand gripping helix as in Figure 4, ensuring that light tension is applied to enable centre coils to be extended (opened) and thereby increasing area coverage of the Bird Flight Diverter.
- It is recommended that these should be installed every 3 metres.



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## APPLICATION **APPLICATION** APPLICATION

### SAFETY CONSIDERATIONS

1. This application procedure is not intended to supersede any company construction or safety standards. This procedure is offered only to illustrate safe application for the individual. **CAUTION: FAILURE TO FOLLOW THESE PROCEDURES AND RESTRICTIONS MAY RESULT IN PERSONAL INJURY OR DEATH.**
2. This product is intended for the specified application. **CAUTION: DO NOT MODIFY THIS PRODUCT UNDER ANY CIRCUMSTANCES.**
3. This product is intended for use by trained craftspeople only. This product **SHOULD NOT BE USED** by anyone who is not familiar with and trained in the use of it.
4. For **PROPER PERFORMANCE AND PERSONAL SAFETY** be sure to select the correct size PREFORMED™ product before application.
5. PREFORMED™ products are precision devices. To insure proper performance, they should be stored in cartons under cover and handled carefully.
6. Helical fittings should not be used as tools. Repeated use will reduce the performance of the fittings and could be dangerous.
7. Do not re-use helical fittings in **ANY CIRCUMSTANCES** as this can reduce the performance of the fittings and could be dangerous.



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## **5 Appendix B: Bird Flight Diverter Quantities per Span**

Note: Quoted span lengths are provisional at this stage and subject to change due to possible re-routing and movement of towers. The Bird Flight Diverter quantities are therefore approximate until such time that the route and tower positions are finalised.



Tower No.	Tower Type	Span m	Bird Flight Diverters in Span
TD206C	L12X D STD	323.27	63
TD207C	L12X D STD	338.97	66
TD2071B	L12X D E6	359.68	70
TD208C	L12X D25 E9	396.94	78
TD209B	L12X D25 E6	348.89	68
TD210B	L12X D E3	344.10	67
TD211C	L12X D STD	335.47	66
TD212C	L12X D E3	322.85	63
TD214A	L12X D25 E6		
TD222	L12X D90 STD	282.20	55
TD222/1A	L12X D M3	272.20	53
TD223	L12X D55 STD	325.80	64
TD224A	L12X D E3	330.29	65
TD225A	L12X D55 STD	343.00	67
TD226B	L12X D E3	353.98	69
TD227B	L12X D STD	338.94	66
TD228	L12X D55 E12	384.88	75
TD229A	L12X D25 E12	237.34	46
TD230B	L12X D E3	332.09	65
TD231B	L12X D E3	462.38	91
TD233B	L12X D E3	402.14	79
TD233/1C	L12X D E3	289.53	56
TD234B	L12X D25 E9	417.92	82
TD235B	L12X D E15	433.95	85
TD236B	L12X D25 E12		
<b>Total</b>			<b>1559</b>



## **6 Appendix C: Bird Flight Diverter Drawing**

Note: Manufacturer data may differ according to which is contracted to the works. The following details from PLP are for information purposes only and not for construction.

ALL DIMENSIONS IN mm

Colour code – Orange

Approx. 4 turns

**NOTES**

1. ROD DIAMETER – 12.7mm.
2. LAY OF FITTING RIGHT.
3. FITTING TO BE COLOUR MARKED ORANGE.
4. MATERIAL – EXTRUDED HIGH IMPACT GREY PVC TO PIP SPECIFICATION MS(G8)38.
5. FITTING TO HAVE THE FOLLOWING MARKINGS: –
  - P1–08
  - BFD
  - BFD 5249068R3
  - 22.89–24.15mm
  - BATCH No

MANUFACTURER	DIMENSION A	APPROXIMATE WEIGHT
PIP (SA)	APPROX 870mm	0.6 kg
PIP (GB)	APPROX 950mm	0.7 kg

B	23/10/2012	RD	OK	PH		ALTERNATIVE MANUFACTURER ADDED AND DIMENSIONAL "A" TABLE ADDED
A	06/09/2012					ORIGINAL
REV	REV DATE	DRAWN	APPRO	CHANGE NUMBER	DESCRIPTION	

CUSTOMER DRAWING TITLE

**BIRD FLIGHT DIVERTER (GREY)**  
Fitting Range Ø22.89 – Ø24.15

**TOLERANCES UNLESS NOTED**

< 30mm = ± 0.7mm

> 30mm = ± 1.25

MILLIMETRES		INCHES	
± 0.1	± 0.004	± 0.005	± 0.0002
± 0.2	± 0.008	± 0.010	± 0.0004
± 0.3	± 0.012	± 0.015	± 0.0006
± 0.5	± 0.020	± 0.025	± 0.0010
± 0.7	± 0.028	± 0.035	± 0.0014
± 1.0	± 0.040	± 0.050	± 0.0020
± 1.5	± 0.060	± 0.075	± 0.0030
± 2.0	± 0.080	± 0.100	± 0.0040
± 3.0	± 0.120	± 0.150	± 0.0060
± 4.0	± 0.160	± 0.200	± 0.0080
± 6.0	± 0.240	± 0.300	± 0.0120
± 8.0	± 0.320	± 0.400	± 0.0160
± 10.0	± 0.400	± 0.500	± 0.0200
± 15.0	± 0.600	± 0.750	± 0.0300
± 20.0	± 0.800	± 1.000	± 0.0400
± 30.0	± 1.200	± 1.500	± 0.0600
± 40.0	± 1.600	± 2.000	± 0.0800
± 50.0	± 2.000	± 2.500	± 0.1000
± 60.0	± 2.400	± 3.000	± 0.1200
± 80.0	± 3.200	± 4.000	± 0.1600
± 100.0	± 4.000	± 5.000	± 0.2000

THE DIMENSIONS IN THIS DRAWING ARE APPROXIMATE AND SHOULD BE USED AS A GUIDE ONLY. THE MANUFACTURER SHALL BE RESPONSIBLE FOR THE FINAL DIMENSIONS OF THE PRODUCT.

DATE	DATE	DATE	DATE	DATE	DATE	DATE	DATE	DATE	DATE
APPRO	DATE	SCALE	NTS	SHEET	OF	SHEET	OF	SHEET	OF
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