



Wire and Cable

Heat-shrink Tubing

Non-shrink Tubing

Braided Sleeving

Screening Braids

Moulded Parts

Terminals and Splices

Wire and Cable Markers

Accessories

Connectors

Backshells

Bonding Leads

Metal Braids

Relays and Contactors

Switches and Grips

Adhesives and Tapes

Application Equipment

Added Value Services

Bonding Leads

INTRODUCTION



Flat, Round, Rope, High-Flex, Lightweight and Quick Release

Manufactured by IS-Cabletec who are part of the IS-Group of companies and can offer a range of specialist high performance metal braid and earth bonding leads, designed and approved for aerospace, defence, industrial and energy market applications.

The comprehensive range of high quality metallic products includes customised and market approved bonding leads, flat, round and rope braids, with various options of materials, terminations, insulation and identification:

Custom Projects

In addition to the standard materials used to produce braids and bonding leads it is also possible to utilise even higher performance materials such as stainless steel, silver plated copper and pure nickel.

These 'specialist' materials exhibit properties suitable for the most demanding applications, such as those requiring extreme temperature and corrosion resistance.

Silver-plated Copper:

For applications needing excellent conductivity at temperatures up to 200°C. Particularly suitable for extreme aerospace and space applications.

Stainless Steel:

Offers outstanding corrosion resistance compared to many materials, particularly when in contact with salt water and high temperature capability up to 400°C. Ideal for off-shore and marine applications.

Nickel:

Pure nickel strand can be used at even higher temperatures (649°C) whilst still exhibiting excellent conductivity and corrosion resistance. Nickel is particularly suitable for applications in extreme conditions such as welding, furnaces and power stations.

Market Approvals

Our sister company is a supplier of bonding leads and metal braid to many of the major aerospace and defence companies of Europe and an influential contributor to the development and promotion of the EN4199 European standard for metal braid and bonding leads.

In addition to EN4199, they manufacture products to a comprehensive range of aerospace and defence specifications, some of which are detailed below.

Airbus

ASNE0088 to 0092

Round braid bonding leads, Tin and nickel plated

Typhoon (Eurofighter)

JN1061	Flat braid bonding leads, Ni plated Cu
JN1151	Flat and rope bonding leads, Ni plated Cu
JN1006	Quick release bonding leads, Sn plated Cu
JN1077	Quick release bonding leads, Ni plated Cu
JN1068	Rope bonding leads, Al

Typhoon, Tornado and Hawk

PAN6619 Quick release bonding leads

General

LN9264, CSP48 and AGS2097

Please contact us for more details.

Custom Specialised

CFBA Series	Custom bonding leads	page 392
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Flat Bonding Leads

FBL Series	Flat bonding leads	page 394
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Round and Rope Bonding Leads

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CRL260 Series	High flex bonding leads	page 404
CFBA1068 Series	Lightweight bonding leads	page 405

Quick Release

QBL150 Series	Quick release bonding leads	page 406
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Bonding Leads

CFBA Custom Series

Material Options
Customised Bonding Leads

In addition to our standard products we are able to supply fully customised bonding leads, each with their own unique part number.

Our bonding leads are constructed from an extensive range of manufactured braids and ropes combined with components from a multitude of termination, insulation and identification options, resulting in bonding leads specifically tailored to meet the demands of your application.

We aim to keep the minimum order quantities low, lead times short and ensure that our product quality and customer service levels are consistently high.

Please contact us with your requirements.

Material Options

- Plain copper
 - Tin-plated copper
 - Nickel-plated copper
 - Aluminium
 - Stainless steel
 - Nickel
 - Silver plated copper
- ...other materials available please contact us.

Terminations

- Crimped terminal
- Pressed ferrules

Braid Styles

- Flat
- Round
- Rope
- Layered

Insulation and Identification

- Various materials available, see our heat-shrink tube product range

Cross-sectional Area

- 1.5mm² to 1000mm²



Features & Benefits






- Broad range of materials and options
- Insulation and identification options
- Short lead times
- Low MOQs



Material Selection

	Conductivity	Corrosion Resistance	Max. Operating Temperature*	Applications
Aluminium	Fair	Fair	371°C	Industrial, Aerospace
Plain Copper	Good	Fair	150°C	Industrial, Rail
Tin-plated Copper	Good	Good	150°C	Industrial, Defence
Stainless Steel	Fair	Excellent	400°C	Industrial, Offshore
Nickel-plated Copper	Excellent	Excellent	260°C	Aerospace, Marine
Pure Nickel	Excellent	Excellent	649°C	Aerospace, Industrial
Silver-plated Copper	Excellent	Good	200°C	Aerospace, Space

Standard Terminal Options (others available)

Ring	Forked	Insulated	Pressed	Quick Release
				
Industrial, Defence, Aerospace	Industrial, Defence	Industrial, Defence, Aerospace	Industrial, Defence, Energy	Aerospace, Defence

Current Rating (Tin-plated Copper)

Cross-sectional Area	Current Rating (amps)
1.5	28
2.5	34
6.0	69
10.0	97
16.0	132
25.0	178
50.0	282
100.0	400

These current ratings are based on a temperature rise of 50°C above ambient

Note: Temperature for uninsulated leads, max operating temperature for insulated leads depends on selected material

For additional information on what is possible or should you have a particular design or application in mind please contact our sales office for details.

Colour tracer identification option available.



Bonding Leads

FBL Series

Tin-plated Copper
Flat Bonding Leads

FBL bonding leads are manufactured from tin plated copper flat braid, terminated at each end with a pressed ferrule type connector. The benefit of using pressed ferrules is that you achieve maximum electrical contact with minimum resistance. FBL bonding leads are flexible, robust, durable and reliable; perfect for the most demanding industrial applications. They are available with a wide range of standard lengths and hole sizes, and with or without insulation. In addition, they have low minimum order quantities and short manufacturing lead times

Operating Temperature

- Tin-plated copper: -65°C to +150°C
- Insulated: -40°C to +135°C



Features & Benefits

- Pressed ferrule design
- Durable and robust
- Ready to fit design

FBL-4-200-M6-S

Part Numbering example

Insulated:

Leave blank if insulation not required

Hole sizes:

See table for options

Standard Lengths:

Customer specified

Cross Sectional Area:

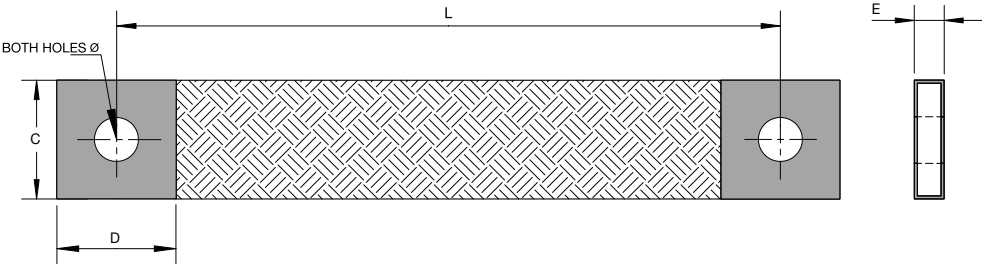
See table for available sizes

Part Reference:

FBL Tin plated copper

Custom Design:

Other non-standard materials and additional terminal options are available on request, please contact our sales office for information.



Hole Size Availability

Cross-sectional Area	Hole Size							
	M4	M5	M6	M8	M10	M12	M14	M16
	4.5mm	5.5mm	6.5mm	8.5mm	10.5mm	13.0mm	15.0mm	18.0mm
4	✓	✓	✓					
6	✓	✓	✓	✓				
10	✓	✓	✓	✓	✓			
16		✓	✓	✓	✓	✓	✓	
25		✓	✓	✓	✓	✓	✓	✓
35		✓	✓	✓	✓	✓	✓	✓
50			✓	✓	✓	✓	✓	✓

Cross Sectional Area and Dimensional Information

Cross-sectional Area	Strand Size	C	D	E	Maximum Allowable Hole Size	Current Rating
mm ²	mm	mm	mm	mm	mm	amps
4	0.15	10	10	2.0	6.5	50
6	0.15	13	15	2.0	8.5	65
10	0.15	14	13	3.0	10.5	90
16	0.20	19	20	3.5	15.0	125
25	0.15	25	25	4.0	18.0	160
35	0.20	25	25	4.5	18.0	220
50	0.20	25	25	5.0	18.0	260

Bonding Leads

CBL150 and CBL260

Tin & Nickel-plated Copper Braid
Flat Bonding Leads

The CBL range of flat style bonding leads are designed for aerospace and military applications, but are also suitable for higher performance industrial uses.

Available with or without insulation in both tin-plated and nickel-plated copper in a range of cross-sectional areas. They are highly flexible, robust and reliable.

Features & Benefits

- Flexible robust and reliable
- Choice of terminal sizes

Operating Temperature

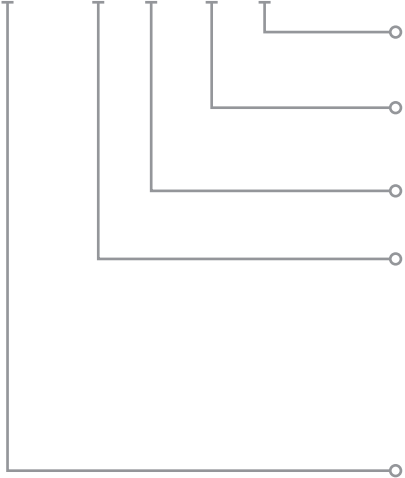
- Tin-plated copper: -65°C to +150°C
- Nickel-plated copper: -65°C to +260°C
- Insulated -65°C to +150°C



Specifications/Approvals

- Manufactured to EN4199-003 design.

CBL260-10-CC-200-S



Part Numbering example

Insulated:

Leave blank if insulation not required

Lengths:

Min. 50mm and above in 25mm increments

Terminal Reference:

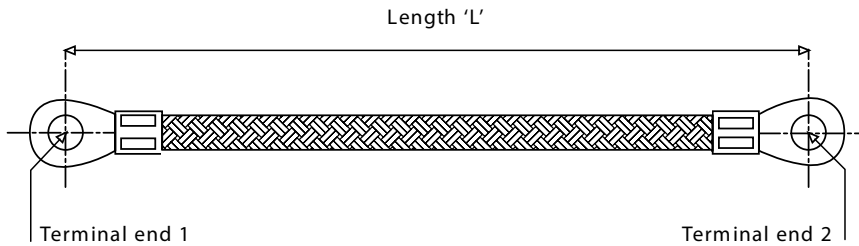
See terminal availability see tables

Cross Sectional Area

1.5	1.5mm ²
4	4mm ²
6	6mm ²
10	10mm ²
16	16mm ²
25	25mm ²

Part Reference:

CBL150	Tin plated copper
CBL260	Nickel plated copper

**Terminal Availability: CBL150 tin-plated copper**

Terminal Code	End Terminals		Availability for Cross-Sectional Area					
	Stud	Hole Ø	1.5mm ²	4.0mm ²	6.0mm ²	10.0mm ²	16.0mm ²	25.0mm ²
A	#6	3.68mm	✓					
B	#8	4.34mm	✓	✓	✓			
C	#10	5.00mm	✓	✓	✓	✓	✓	✓
D	1/4"	6.73mm	✓	✓	✓	✓	✓	✓
E	5/16"	8.33mm		✓	✓	✓	✓	✓
F	3/8"	9.91mm				✓	✓	✓

Terminal Availability: CBL260 nickel-plated copper

Terminal Code	End Terminals		Availability for Cross-Sectional Area					
	Stud	Hole Ø	1.5mm ²	4.0mm ²	6.0mm ²	10.0mm ²	16.0mm ²	25.0mm ²
A	#6	3.68mm	✓	✓				
B	#8	4.34mm	✓	✓	✓			
C	#10	5.00mm	✓	✓	✓	✓		
D	1/4"	6.73mm	✓	✓	✓	✓	✓	
E	5/16"	8.33mm			✓	✓	✓	
F	3/8"	9.91mm					✓	✓

Technical Information for Uninsulated CBL260 (Nickel-plated copper) Leads

Braid cross-section	Min. Tensile Strength	Nom. resistance 100mm Length	Braid Resistance	Nom. Mass 100mm Length	Braid Mass
mm ²	N	mΩ	mΩ per 25mm	g	g per 25mm
1.5	250	1.32	0.308	2.6	0.40
4	600	0.40	0.112	6.3	1.10
6	800	0.24	0.075	10.7	1.63
10	1200	0.14	0.046	18.4	2.90
16	1700	0.09	0.030	28.9	3.93
25	2200	0.06	0.015	43.2	7.85

For information on nominal resistance and mass for non standard lengths please contact us

Bonding Leads

LN9264

Tin and Nickel Plated Copper Braid Bonding Leads

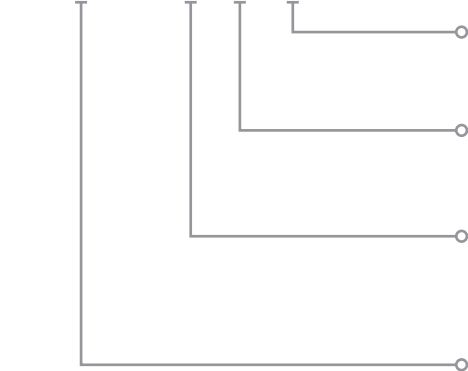
LN9264 is a long established aerospace and defence specification containing a series of uninsulated tin and nickel plated copper bonding leads terminated with a range of crimp style round terminals. They are available in six standard cross-sectional areas and a limited range of lengths.

Operating Temperature

- Tin-plated copper: -65°C to +150°C
- Nickel-plated copper: -65°C to +260°C



CFBA9264-4-160-N



Features & Benefits

- Flat style braid
- Aerospace and military approved

Part Numbering example

Material:

- T Tin plated copper
- N Nickel plated copper

Standard Lengths:

60mm, 80mm, 100mm, 125mm, 160mm, 200mm and 250mm

Cross Sectional Area

- | | | | |
|-----|--------------------|----|-------------------|
| 1.5 | 1.5mm ² | 4 | 4mm ² |
| 6 | 6mm ² | 10 | 10mm ² |
| 16 | 16mm ² | 25 | 25mm ² |

Part Reference:

CFBA9264

Braid cross-section	Current	Resistance @ 20°C	Terminal Hole Ø
mm ²	amps	Ω/1000m	mm
1.5	16	14.2	4.34
4	30	5.3	5.00
6	40	3.5	6.73
10	65	2.1	6.73
16	80	1.3	8.33
25	125	0.85	9.91

AGS2097Tin-plated Copper Braid
Bonding Leads

AGS2097 bonding leads are a series of aerospace approved bonding leads, generally, but not exclusively, found on legacy aircraft such as Tornado, Hawk and the C-130 (Hercules).

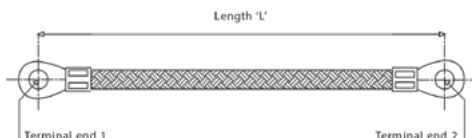
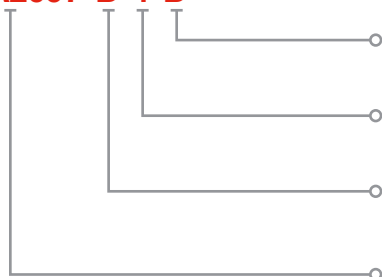
They are only available with one standard braid size 0.7mm^2 and a combination of terminal sizes and lengths.

Operating Temperature

- Tin-plated copper: -65°C to $+150^{\circ}$

RoHS
compliant**Features & Benefits**

- Aerospace approved
- 0.7mm^2 cross-sectional area
- Multiple lengths

CFBA2097-B-4-B**Part Numbering example****Terminal Code**

End 2

Standard Lengths:

1" increments, minimum length 3".

Terminal Code

End 1

Part Reference:

CFBA2097

Terminal Code	Hole Diameter (mm)
B	3.68
C	5.00
E	6.73
G	8.33
J	9.91

Bonding Leads

CFBA4199-004 Series

Tin and Nickel-plated Copper Braid
Round Bonding Leads

CFBA4199-004 bonding leads are designed specifically for Aerospace and Military applications. They have undergone extensive mechanical and electrical testing, including flex testing to 250,000 cycles, sinusoidal and random vibration cycles, salt mist testing and temperature cycling.

CFBA4199-004 bonding leads are manufactured from multi-layer round braid and are available in tin-plated and nickel plated copper in a variety of cross-sectional areas, lengths and termination options.

Operating Temperature

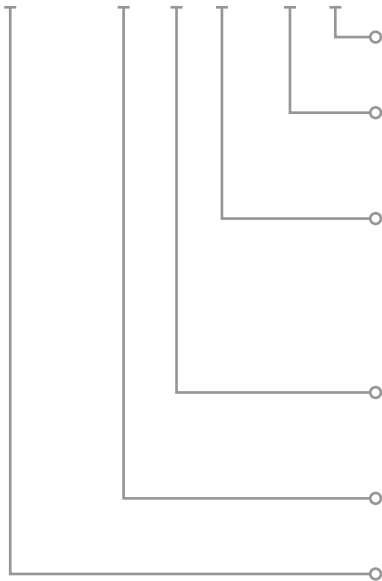
- Tin-plated copper: -65°C to +150°C
- Nickel-plated copper: -65°C to +260°C



Specifications/Approvals

- Tested to EN4199-001

CFBA4199-004-N-7.0-250-E



Part Numbering example

Terminal Code:

E See table opposite

Standard Lengths:

250 See table opposite, other lengths available on request.

Cross Sectional Area

1.4	1.4mm ²
3.5	3.5mm ²
4.5	4.5mm ²
7.0	7.0mm ²
13.0	13mm ²

Material:

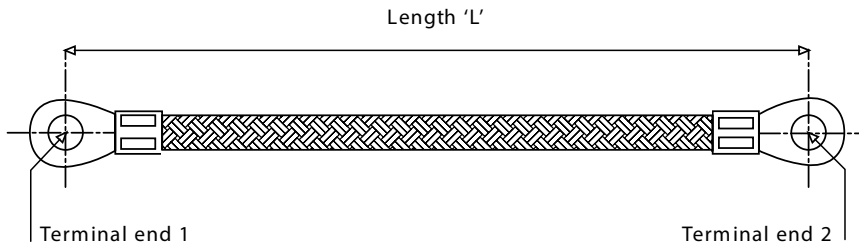
T Tin-plated copper
N Nickel-plated copper

Product standard:

CFBA4199-004

Part Reference:

CFBA4199



Terminal Code	End One		End Two		Availability for Cross-Sectional Area				
	Stud	Hole Ø	Stud	Hole Ø	1.4mm ²	3.5mm ²	4.5mm ²	7.0mm ²	13.0mm ²
A	#6	3.68mm	#6	3.68mm	✓	✓	✓		
B	#8	4.34mm	#8	3.68mm	✓	✓	✓		
C	#10	5.00mm	#6	3.68mm	✓	✓	✓		
D	1/4"	6.73mm	#6	3.68mm	✓	✓	✓		
E	#8	4.34mm	#8	4.34mm	✓	✓	✓	✓	
F	#10	5.00mm	#8	4.34mm	✓	✓	✓	✓	
G	1/4"	6.73mm	#8	4.34mm	✓	✓	✓	✓	
H	#10	5.00mm	#10	5.00mm	✓	✓	✓	✓	✓
J	1/4"	6.73mm	#10	5.00mm	✓	✓	✓	✓	✓
K	1/4"	6.73mm	1/4"	6.73mm	✓	✓	✓	✓	✓
L	5/16"	8.33mm	#10	5.00mm	✓			✓	✓
M	5/16"	8.33mm	5/16"	8.33mm	✓			✓	✓
N	5/16"	8.33mm	1/4"	6.73mm					✓

Standard Lengths	Availability for Cross-Sectional Area				
'L' mm	1.4mm ²	3.5mm ²	4.5mm ²	7.0mm ²	13.0mm ²
63	✓			✓	
80	✓	✓	✓	✓	✓
100	✓	✓	✓	✓	✓
125	✓	✓	✓	✓	✓
160	✓	✓	✓	✓	✓
200	✓	✓	✓	✓	✓
250	✓	✓		✓	✓
315	✓			✓	
400	✓	✓	✓	✓	
500		✓		✓	
630				✓	
800				✓	

Bonding Leads

RBL Series

Tin-plated Copper
Rope Bonding Leads

RBL bonding leads are stranded rope construction assemblies manufactured from annealed copper ETP1 manufactured to BS EN13602. They are robust, highly flexible and durable, making them perfectly suited to dynamic applications and those in high vibration environments.

In addition, RBL bonding leads boast large cross-sectional areas whilst keeping overall diameters to a minimum making them ideal for size restricted applications.

Operating Temperature

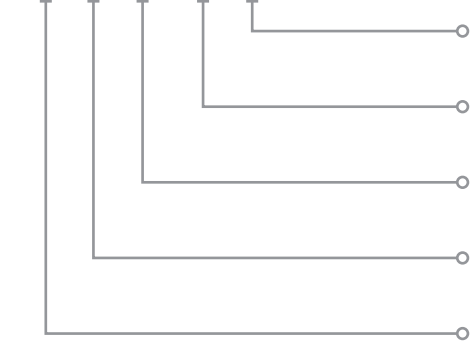
- Tin-plated copper: -65°C to +150°C
- Insulated: -40°C to +135°C



Features & Benefits

- Multi-directional flexibility
- Durable and robust design

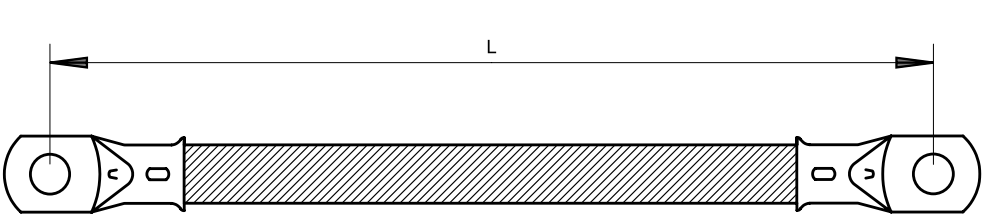
RBL-4-200-M6-S



Part Numbering example

- Insulated:**
Leave blank if insulation not required
- Hole sizes:**
See table for options
- Standard Lengths:**
Customer specified
- Cross Sectional Area:**
See table for available sizes
- Part Reference:**
RBL Tin plated copper

Custom Design:
Other non-standard materials and additional terminal options are available on request, please contact our sales office for information.



Hole Size Availability

Cross-sectional Area (mm²)	Hole Size							
	M4	M5	M6	M8	M10	M12	M14	M16
	4.5mm	5.5mm	6.5mm	8.5mm	10.5mm	13.0mm	15.0mm	18.0mm
4	✓	✓	✓	✓	✓			
6	✓	✓	✓	✓	✓	✓		
10		✓	✓	✓	✓	✓		
16		✓	✓	✓	✓	✓		
25		✓	✓	✓	✓	✓		
35		✓	✓	✓	✓	✓	✓	✓
50		✓	✓	✓	✓	✓	✓	✓

Current Rating Information

Cross-sectional Area	Current Rating
mm²	amps
4	50
6	60
10	80
16	120
25	150
35	200
50	240

Bonding Leads

CRL260 Series

Nickel-plated Copper Braid
High Flex Bonding Leads

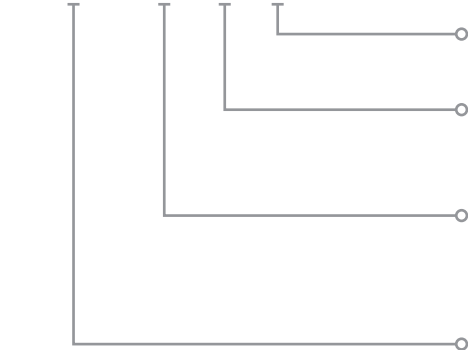
CRL260 bonding leads are designed to withstand exceptional levels of flexing in combination with outstanding resistance to corrosion and salt attack. When tested to the flex endurance test in EN4199-001, they withstand over 5 million cycles. Outperforming other existing aerospace standard leads by more than 5 times. Particularly suited for dynamic applications in exposed areas such as external aircraft doors and flaps.

Operating Temperature

- Nickel-plated copper: -65°C to +260°



CRL260-5.0-200-A



Features & Benefits

- Flex endurance to EN4199-001
- Choice of 5 cross sectional areas
- Choice of terminal sizes

Part Numbering example

Terminal Code:

See terminal availability see table below

Standard Lengths:

Min. 50mm and above
in 25mm increments

Cross Sectional Area

3.5	3.5mm ²	5.0	5mm ²
7.0	7mm ²	10.0	10mm ²
13.0	13mm ²		

Part Reference:

CRL260 Nickel plated copper

Terminal Availability: CRL260 nickel-plated copper

Code	Terminals	Availability for Cross-Sectional Area				
	Hole Ø	3.5mm ²	5.0mm ²	7.0mm ²	10.0mm ²	13.0mm ²
A	3.68mm	✓				
B	5.00mm	✓	✓	✓	✓	✓
C	6.73mm	✓	✓	✓	✓	✓
D	8.33mm	✓	✓	✓	✓	✓
E	9.91mm	✓	✓	✓	✓	✓

CFBA1068 Series

Aluminium Braid
Lightweight Bonding LeadsRoHS
compliant

The CFBA1068 aluminium bonding leads are designed for aerospace applications requiring electrical bonding in combination with lightweight. They are supplied insulated and with a protective chromate conversion coating*, making them particularly suited to applications in contact with aviation fuels.

CFBA1068 bonding leads are available in a range of lengths and two sizes of specially formed aluminium terminals.

Operating Temperature

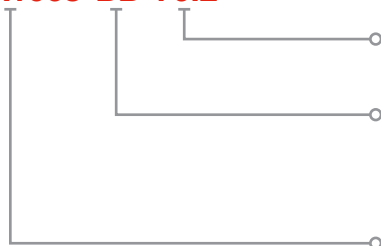
- Aluminium: +200°

**Insulated and available with or without Chromate conversion coating.*

Features & Benefits

- Aluminium*
- Lightweight 5mm² cross-sectional area

CFBA1068-BB-76.2



Part Numbering example

Standard Lengths:

See table below

Terminal Code Reference:

- A** M3 (3.61 to 3.86mm)
- B** M4 (4.90 to 5.16mm)
- C** M5/M6 (6.48 to 7.24mm)

Part Reference:

CFBA1068 Aluminium

Technical Information (nominal values)

Bonding Lead length	Resistance (between terminals)	Mass (uninsulated)
mm	mΩ	(g)
76.2	2.36	4.0
101.6	2.78	4.4
127.5	3.20	4.9
152.4	3.62	5.3
177.8	4.04	5.8
203.2	4.46	6.3
228.6	4.88	6.7
254.0	5.30	7.2

Bonding lead length is between terminal hole centres

Bonding Leads

QBL150 Series

Tin-plated Copper Braid
Quick Release Bonding Leads

The QBL150 quick release bonding lead provides an effective hand-releasable method of earth bonding electrical equipment. They are particularly useful for applications where a temporary connection is required when equipment needs to be removed quickly over multiple times.

QBL bonding leads comprise of a flat tin-plated copper braid with a crimped ring terminal at one end and a BNC or TNC connector at the other. Connection to equipment is via a mating receptacle, mounted on the equipment being earthed.

Operating Temperature

- Tin-plated copper: -55°C to +120°
- Insulated: -55°C to +120°

Features & Benefits

- Fast and easy release.
- Rear and front mounted mating receptacle
- BNC or TNC connector

Part Numbering example

Insulated:

Leave blank if insulation not required

Terminal Code Reference:

- A** M3 (5mm hole)
- B** M4 (6.73mm hole)

Standard Lengths:

Min. 50mm and above in 25mm increments

Connector Code Reference:

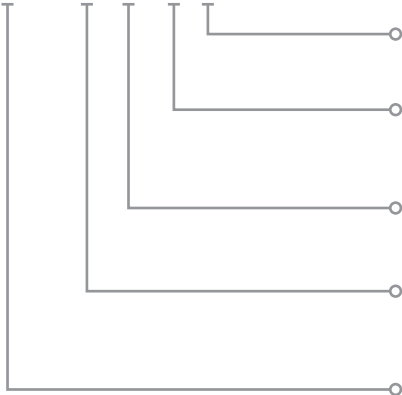
- B** BNC (bayonet)
- T** TNC (threaded)

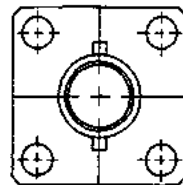
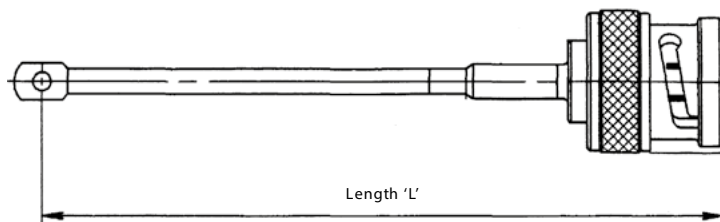
Part Reference:

QBL150 Tin plated copper
Also available as Nickel plated copper, without insulation for higher operating temperatures.



QBL150-B-50-A-S



Front mounted
receptacle**Technical Details: QBL150B (BNC Type)**

Connector	BNC, MIL-C-39012 B (class 2, category c)
Braid	2.64mm ² , Tin plated copper
Current rating	36 amps (for 60 seconds)
Operating temperature	-55°C to +120°C
Insulation	PAN6480K04
Front panel mounting receptacle	QBL150-BF
Rear panel mounting receptacle	QBL150-BR
Ring terminal hole diameter	5mm or 6.73mm

	Length (mm) Terminals						
Nominal	50	75	100	125	150	175	200
Mass (g) 5.0mm hole	-	26.5	27.0	27.5	28.2	28.5	29.5
Mass (g) 6.0mm hole	-	26.9	27.4	27.9	28.6	28.9	29.9
Resistance (mΩ)	0.4	0.6	0.8	1.0	1.2	1.4	1.6

Technical Details: QBL150T (TNC Type)

Connector	TNC, PAN6444A
Braid	2.64mm ² , Tin plated copper
Current rating	36 amps (for 60 seconds)
Operating temperature	-55°C to +120°C
Insulation	PAN6480K04
Front panel mounting receptacle	QBL150-TF
Ring terminal hole diameter	5mm or 6.73mm

	Length (mm) Terminals						
Nominal	50	75	100	125	150	175	200
Mass (g) 5.0mm hole	26.0	26.5	27.0	27.5	28.2	28.8	29.5
Mass (g) 6.0mm hole	26.4	26.9	27.4	27.9	28.6	29.2	29.9
Resistance (mΩ)	0.4	0.6	0.8	1.0	1.2	1.4	1.6

