

# EARTHING & LIGHTNING SYSTEMS

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## Introduction

Borna Electronics Co. is a highly specialized Iranian company operating for more than 35 years in the field of industrial electronic and electric equipment, such as cathodic protection component, earthing & lightning systems, exothermic welding systems, electronic relays, and industrial resistors etc. In field of earthing & lightning Systems, Borna Electronic is providing below services:

- Design and engineering of earthing & lightning systems.
- Consulting services for industrial and non- industrial units.
- Manufacturing equipment with the use of advanced machinery in accordance with the latest international standards.
- Implementation, commissioning and optimization of earthing & lightning systems.
- Repair, maintenance, and periodical visit to ensure the correct operation of the system.

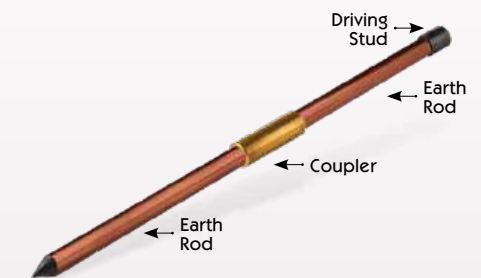
# Earthing Materials

## Earth Rods & Accessories

High quality earth rods are usually made from either solid copper, stainless steel or copper bonded steel. Borna Electronics can supply all three types in a variety of dimensions with their accessories such as clamps, driving stud, coupler, and spike. The copper bonded steel cored rod is the most popular, due to its combination of strength, corrosion resistance, and comparatively low cost. Solid copper and stainless steel rods provide a very high level of corrosion resistance at the expense of lower strength and higher cost.

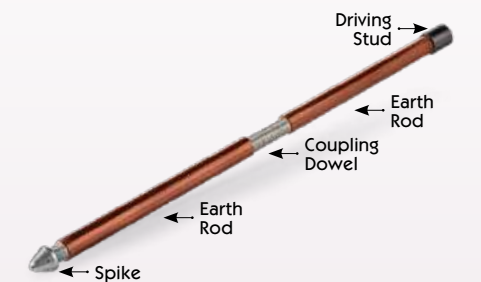
### Copper Bond Earth Rods

| Nominal Diameter (mm) | Length (mm) | Shank Dia (mm) | Weight (kg) | Part No. |
|-----------------------|-------------|----------------|-------------|----------|
| 16                    | 1200        | 14.2           | 1.53        | CBR 1612 |
| 16                    | 1500        | 14.2           | 1.88        | CBR 1615 |
| 20                    | 1200        | 17.2           | 2.19        | CBR 2012 |
| 20                    | 1500        | 17.2           | 2.73        | CBR 2015 |



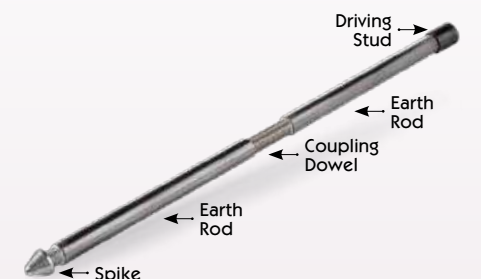
### Solid Copper Earth Rods

| Nominal Diameter (mm) | Length (mm) | Thread Size | Weight (kg) | Part No. |
|-----------------------|-------------|-------------|-------------|----------|
| 16                    | 1200        | M8          | 2.1         | SCR 1612 |
| 16                    | 1500        | M8          | 2.6         | SCR 1615 |
| 20                    | 1200        | M10         | 4.1         | SCR 2012 |
| 20                    | 1500        | M10         | 5.4         | SCR 2015 |



### Stainless Steel Earth Rods

| Nominal Diameter (mm) | Length (mm) | Thread Size | Weight (kg) | Part No. |
|-----------------------|-------------|-------------|-------------|----------|
| 16                    | 1200        | M8          | 2           | SSR 1612 |
| 16                    | 1500        | M8          | 2.4         | SSR 1615 |
| 20                    | 1200        | M10         | 3           | SSR 2012 |
| 20                    | 1500        | M10         | 3.8         | SSR 2015 |

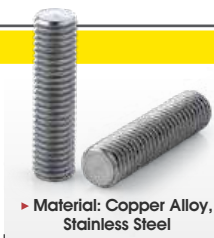




| Coupling                  |                    |          |
|---------------------------|--------------------|----------|
| Rod Nominal Diameter (mm) | Thread Size (inch) | Part No. |
| 16                        | 5/8                | RCP 16   |
| 20                        | 3/4                | RCP 20   |



| Coupling Dowel            |            |          |
|---------------------------|------------|----------|
| Rod Nominal Diameter (mm) | Dowel Size | Part No. |
| 16                        | M8         | RCD 16   |
| 20                        | M10        | RCD 20   |



| Driving Stud              |          |
|---------------------------|----------|
| Rod Nominal Diameter (mm) | Part No. |
| 16                        | RDS 16   |
| 20                        | RDS 20   |



| Spike                     |          |
|---------------------------|----------|
| Rod Nominal Diameter (mm) | Part No. |
| 16                        | RSP 16   |
| 20                        | RSP 20   |



| Rod to Wire "U" Clamp     |                      |          |
|---------------------------|----------------------|----------|
| Rod Nominal Diameter (mm) | Conductor Size (mm²) | Part No. |
| 16                        | 6-35                 | RWU 161  |
|                           | 50-120               | RWU 162  |
|                           | 150-300              | RWU 163  |
| 20                        | 6-35                 | RWU 201  |
|                           | 50-120               | RWU 202  |
|                           | 150-300              | RWU 203  |



| Rod to Tape "U" Clamp     |                     |          |
|---------------------------|---------------------|----------|
| Rod Nominal Diameter (mm) | Conductor Size (mm) | Part No. |
| 16                        | 20x3                | RTU 160  |
|                           | 25x3                | RTU 162  |
|                           | 30x3                | RTU 163  |
|                           | 50x5                | RTU 165  |
|                           | 60x5                | RTU 166  |
| 20                        | 20x3                | RTU 200  |
|                           | 25x3                | RTU 202  |
|                           | 30x3                | RTU 203  |
|                           | 50x5                | RTU 205  |
|                           | 60x5                | RTU 206  |



| Rod to Wire Clamp         |                      |          |
|---------------------------|----------------------|----------|
| Rod Nominal Diameter (mm) | Conductor Size (mm²) | Part No. |
| 16                        | 6-35                 | RWC 161  |
|                           | 50-120               | RWC 162  |
|                           | 150-300              | RWC 163  |
| 20                        | 6-35                 | RWC 201  |
|                           | 50-120               | RWC 202  |
|                           | 150-300              | RWC 203  |



| Rod to Tape Clamp         |                     |          |
|---------------------------|---------------------|----------|
| Rod Nominal Diameter (mm) | Conductor Size (mm) | Part No. |
| 16                        | 20x3                | RTC 160  |
|                           | 25x3                | RTC 162  |
|                           | 30x3                | RTC 163  |
|                           | 50x5                | RTC 165  |
|                           | 60x5                | RTC 166  |
| 20                        | 20x3                | RTC 200  |
|                           | 25x3                | RTC 202  |
|                           | 30x3                | RTC 203  |
|                           | 50x5                | RTC 205  |
|                           | 60x5                | RTC 206  |



### ◆ Copper Earth Plate

| Dimension (mm) | Part No. |
|----------------|----------|
| 320x320x3      | CEP 323  |
| 400x400x3      | CEP 403  |
| 600x600x3      | CEP 603  |
| 600x600x4      | CEP 604  |
| 660x660x3      | CEP 663  |
| 660x660x5      | CEP 665  |
| 1000x660x3     | CEP 103  |
| 1000x660x5     | CEP 105  |



### ◆ Inspection Earth Pit

| Dimension (mm) | Material           | Part No. |
|----------------|--------------------|----------|
| 320x320x230    | Concrete           | EPC1     |
| 400x400x600    | Concrete           | EPC2     |
| 650x650x400    | Concrete           | EPC3     |
| 300x300x350    | Hot Dip Galvanized | EPG1     |
| 400x400x400    | Hot Dip Galvanized | EPG2     |
| 250x400x300    | Poly Ethylene      | EPP1     |
| 300x400x480    | Poly Ethylene      | EPP2     |



### ◆ Low Ohm Material

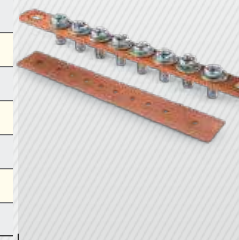
Low Ohm Materials (Activated Bentonite) used as an earth-electrode backfill in order to reduce soil resistivity. It has the ability to hold its moisture content for a long period of time and to absorb moisture from the surrounding soil.

| Material            | Part No. |
|---------------------|----------|
| Activated Bentonite | BLOM 01  |
| Carbon Graphite     | BLOM 02  |



### ◆ Earth Busbar

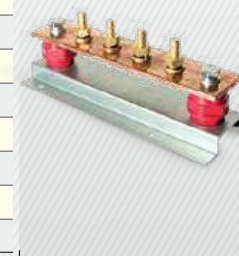
| Earth Bar           |                  |          |
|---------------------|------------------|----------|
| Tape Dimension (mm) | Number of Holes. | Part No. |
| 160x30x3            | 4                | CEB 04   |
| 200x30x3            | 5                | CEB 05   |
| 240x50x5            | 6                | CEB 06   |
| 280x50x5            | 7                | CEB 07   |
| 320x50x5            | 8                | CEB 08   |
| 400x50x5            | 10               | CEB 10   |
| 480x50x5            | 12               | CEB 12   |
| 560x50x5            | 14               | CEB 14   |



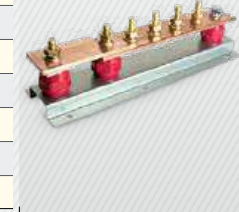
| Test Link           |          |
|---------------------|----------|
| Tape Dimension (mm) | Part No. |
| 120x30x3            | CTL 303  |
| 120x50x5            | CTL 505  |



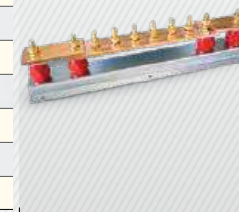
| Earth Bar with Holder |                     |          |
|-----------------------|---------------------|----------|
| Number of Connections | Tape Dimension (mm) | Part No. |
| 2                     | 160x30x3            | EBH 02   |
| 3                     | 200x30x3            | EBH 03   |
| 4                     | 240x50x5            | EBH 04   |
| 5                     | 280x50x5            | EBH 05   |
| 6                     | 320x50x5            | EBH 06   |
| 8                     | 440x50x5            | EBH 08   |
| 10                    | 520x50x5            | EBH 10   |
| 12                    | 600x50x5            | EBH 12   |



| Earth Bar with Single Disconnecting Link |                     |          |
|--|---------------------|----------|
| Number of Connections                    | Tape Dimension (mm) | Part No. |
| 3  | 270x50x5            | EBD 031  |
| 4  | 315x50x5            | EBD 041  |
| 5  | 355x50x5            | EBD 051  |
| 6  | 395x50x5            | EBD 061  |
| 8  | 515x50x5            | EBD 081  |
| 10                                       | 595x50x5            | EBD 101  |
| 12                                       | 675x50x5            | EBD 121  |



| Earth Bar with Double Disconnecting Links |                     |          |
|---|---------------------|----------|
| Number of Connections                     | Tape Dimension (mm) | Part No. |
| 3   | 350x50x5            | EBD 032  |
| 4   | 390x50x5            | EBD 042  |
| 5   | 430x50x5            | EBD 052  |
| 6   | 470x50x5            | EBD 062  |
| 8   | 590x50x5            | EBD 082  |
| 10  | 670x50x5            | EBD 102  |
| 12  | 750x50x5            | EBD 122  |



### ◆ Bare Stranded Copper Conductor

| Wire Size (mm²) | Part No. |
|-----------------|----------|
| 6               | CWB 006  |
| 10              | CWB 010  |
| 16              | CWB 016  |
| 25              | CWB 025  |
| 35              | CWB 035  |
| 50              | CWB 050  |
| 70              | CWB 070  |
| 95              | CWB 095  |
| 120             | CWB 120  |
| 150             | CWB 150  |
| 185             | CWB 185  |
| 240             | CWB 240  |
| 300             | CWB 300  |



### ◆ Yellow/Green Insulated Copper Conductor

| Wire Size (mm²) | Part No. |
|-----------------|----------|
| 6               | YGB 006  |
| 10              | YGB 010  |
| 16              | YGB 016  |
| 25              | YGB 025  |
| 35              | YGB 035  |
| 50              | YGB 050  |
| 70              | YGB 070  |
| 95              | YGB 095  |
| 120             | YGB 120  |
| 150             | YGB 150  |
| 185             | YGB 185  |
| 240             | YGB 240  |
| 300             | YGB 300  |



### ◆ Green/Yellow Insulated Copper Conductor

| Wire Size (mm²) | Part No. |
|-----------------|----------|
| 6               | GYB 006  |
| 10              | GYB 010  |
| 16              | GYB 016  |
| 25              | GYB 025  |
| 35              | GYB 035  |
| 50              | GYB 050  |
| 70              | GYB 070  |
| 95              | GYB 095  |
| 120             | GYB 120  |
| 150             | GYB 150  |
| 185             | GYB 185  |
| 240             | GYB 240  |
| 300             | GYB 300  |



### ◆ Earthing Copper Tape

| Tape Dimension (mm) | Part No. |
|---------------------|----------|
| 20x3                | ECT 203  |
| 25x3                | ECT 253  |
| 30x3                | ECT 303  |
| 50x5                | ECT 505  |
| 60x5                | ECT 605  |



### ◆ Flexible Copper Braid Bond

| Tape Dimension (mm) | Length (mm) | Part No. |
|---------------------|-------------|----------|
| 15x1.5              | 400         | FCB 1540 |
| 19x2.5              | 200         | FCB 1920 |
| 25x3                | 400         | FCB 2540 |
| 30x5                | 200         | FCB 3020 |
| 32x6                | 200         | FCB 3220 |





◆ Air Termination

Air Rod

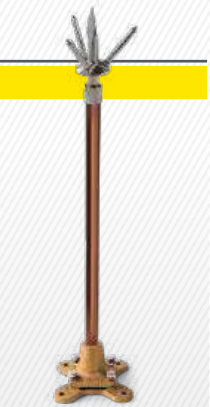
| Rod Diameter (mm) | Length (mm) | Part No. |
|-------------------|-------------|----------|
| 16                | 500         | BAR 1605 |
|                   | 1000        | BAR 1610 |
|                   | 1200        | BAR 1612 |
|                   | 1500        | BAR 1615 |
|                   | 2000        | BAR 1620 |
| 20                | 500         | BAR 2005 |
|                   | 1000        | BAR 2010 |
|                   | 1200        | BAR 2012 |
|                   | 1500        | BAR 2015 |
|                   | 2000        | BAR 2020 |



► Material: Copper, Tinned Copper, Nickel Chrome Coated Copper, Stainless Steel

Multi-Point Air Rod

| Rod Diameter (mm) | Length (mm) | Part No.  |
|-------------------|-------------|-----------|
| 16                | 500         | MBAR 1605 |
|                   | 1000        | MBAR 1610 |
|                   | 1200        | MBAR 1612 |
|                   | 1500        | MBAR 1615 |
|                   | 2000        | MBAR 1620 |
| 20                | 500         | MBAR 2005 |
|                   | 1000        | MBAR 2010 |
|                   | 1200        | MBAR 2012 |
|                   | 1500        | MBAR 2015 |
|                   | 2000        | MBAR 2020 |



► Material: Copper, Tinned Copper, Nickel Chrome Coated Copper, Stainless Steel

Cable Clip

| Wire Size (mm²) | Part No. |
|-----------------|----------|
| 6               | CLP 006  |
| 10              | CLP 010  |
| 16              | CLP 016  |
| 25              | CLP 025  |
| 35              | CLP 035  |
| 50              | CLP 050  |
| 70              | CLP 070  |
| 95              | CLP 095  |
| 120             | CLP 120  |
| 150             | CLP 150  |
| 185             | CLP 185  |
| 240             | CLP 240  |
| 300             | CLP 300  |



► Material: Copper

Cable Clamp (Type A)

| Wire Size (mm²) | Part No. |
|-----------------|----------|
| 6               | CCA 006  |
| 10              | CCA 010  |
| 16              | CCA 016  |
| 35              | CCA 035  |
| 50              | CCA 050  |
| 70              | CCA 070  |
| 95              | CCA 095  |
| 120             | CCA 120  |
| 150             | CCA 150  |
| 185             | CCA 185  |
| 240             | CCA 240  |
| 300             | CCA 300  |



► Material: Copper Alloy

# Lightning Materials

A lightning rod is a metal rod, which usually manufactured from high conductivity hard drawn copper, nickel chrome coated copper, tinned copper or stainless steel mounted on a structure and intended to protect the structure from a lightning strike. If lightning hits the structure, it will preferentially strike the rod and be conducted to ground through a wire, instead of passing through the structure, where it could start a fire or cause electrocution.



# Conductor Clamps

Borna Electronics is providing different types of earthing and lightning clamps which are made from high quality copper, copper alloy and aluminum alloys. They are simple to install, providing an effective low resistance connection between earthing equipment. The connections which have been made by clamps are easily made or remade to allow for periodic inspections.

Cable Clamp (Type B)

| Wire Size (mm²) | Part No. |
|-----------------|----------|
| 6               | CCB 006  |
| 10              | CCB 010  |
| 16              | CCB 016  |
| 35              | CCB 035  |
| 50              | CCB 050  |
| 70              | CCB 070  |
| 95              | CCB 095  |
| 120             | CCB 120  |
| 150             | CCB 150  |
| 185             | CCB 185  |
| 240             | CCB 240  |
| 300             | CCB 300  |



► Material: Copper Alloy

Air Rod Saddle

| Rod Diameter (mm) | Wire Size (mm²) | Tape Dimension (mm) | Thread Size | Part No. |
|-------------------|-----------------|---------------------|-------------|----------|
| 16                | 6-16            | 20x3                | M16         | ARS 161  |
|                   | 25-50           | 25x3                |             | ARS 162  |
|                   | 70-120          | 30x3                |             | ARS 163  |
|                   | 150-185         | 50x5                |             | ARS 164  |
|                   | 240-300         | 60x5                |             | ARS 165  |
| 20                | 6-16            | 20x3                | M20         | ARS 201  |
|                   | 25-50           | 25x3                |             | ARS 202  |
|                   | 70-120          | 30x3                |             | ARS 203  |
|                   | 150-185         | 50x5                |             | ARS 204  |
|                   | 240-300         | 60x5                |             | ARS 205  |



► Material: Copper Alloy

Free Standing Mast

| Length (m) | Part No. |
|------------|----------|
| 2          | FSM 02   |
| 3          | FSM 03   |
| 4          | FSM 04   |
| 5          | FSM 05   |
| 6          | FSM 06   |
| 8          | FSM 08   |
| 10         | FSM 10   |



► Material: Hot Dip Galvanized Steel

Wire to Tape Clamp (Type A)

| Wire Size (mm²) | Tape Dimension (mm)                  | Part No. |
|-----------------|--------------------------------------|----------|
| 6               | 20x3<br>25x3<br>30x3<br>50x5<br>60x5 | WTC 006  |
| 10              |                                      | WTC 010  |
| 16              |                                      | WTC 016  |
| 35              |                                      | WTC 035  |
| 50              |                                      | WTC 050  |
| 70              |                                      | WTC 070  |
| 95              |                                      | WTC 095  |
| 120             |                                      | WTC 120  |
| 150             |                                      | WTC 150  |
| 185             |                                      | WTC 185  |
| 240             |                                      | WTC 240  |
| 300             |                                      | WTC 300  |



► Material: Copper Alloy

Wire to Tape Clamp (Type B)

| Tape Dimension (mm) | Wire Size (mm²) | Part No. |
|---------------------|-----------------|----------|
| 20x3                | 16-185          | WTC 203  |
| 25x3                |                 | WTC 253  |
| 30x3                |                 | WTC 303  |
| 50x5                |                 | WTC 505  |
| 60x5                |                 | WTC 605  |



► Material: Copper Alloy

Cross Cable Clamp

| Wire Size (mm²) | Part No. |
|-----------------|----------|
| 6               | CCX 006  |
| 10              | CCX 010  |
| 16              | CCX 016  |
| 35              | CCX 035  |
| 50              | CCX 050  |
| 70              | CCX 070  |
| 95              | CCX 095  |
| 120             | CCX 120  |
| 150             | CCX 150  |
| 185             | CCX 185  |
| 240             | CCX 240  |
| 300             | CCX 300  |



► Material: Copper Alloy

Tape to Wire Test Clamp

| Tape Dimension (mm) | Wire Size (mm²) | Part No. |
|---------------------|-----------------|----------|
| 20x3                | 6-70            | TWT 203  |
| 25x3                | 6-70            | TWT 253  |
| 30x3                | 16-120          | TWT 303  |
| 50x5                | 16-185          | TWT 505  |
| 60x5                | 35-300          | TWT 605  |



► Material: Copper Alloy

Air Rod Wall Base (Type A)

| Rod Diameter (mm) | Part No. |
|-------------------|----------|
| 16                | WBA 16   |
| 20                | WBA 20   |



► Material: Copper Alloy

Air Rod Wall Base (Type A)

| Rod Diameter (mm) | Part No. |
|-------------------|----------|
| 16                | WBB 16   |
| 20                | WBB 20   |



► Material: Nickel Chrome Coated Copper Alloy





► Material: Copper Alloy

| Parallel Wire Clamp          |           |          | T Clamp Connectors           |           |          | Wire to Structure Clamp      |           |          |
|------------------------------|-----------|----------|------------------------------|-----------|----------|------------------------------|-----------|----------|
| Wire Size (mm <sup>2</sup> ) | Bolt Size | Part No. | Wire Size (mm <sup>2</sup> ) | Bolt Size | Part No. | Wire Size (mm <sup>2</sup> ) | Bolt Size | Part No. |
| 16-35                        | M6        | PWC35    | 16                           | M6        | TWC16    | 35-70                        | M8        | WSC70    |
| 35-70                        | M6        | PWC70    | 35                           | M6        | TWC35    | 95-185                       | M10       | WSC185   |
| 95-185                       | M8        | PWC185   | 50                           | M6        | TWC50    |                              |           |          |
| 240-300                      | M10       | PWC300   | 70                           | M8        | TWC70    |                              |           |          |
|                              |           |          | 95                           | M8        | TWC95    |                              |           |          |
|                              |           |          | 120                          | M8        | TWC120   |                              |           |          |
|                              |           |          | 185                          | M10       | TWC185   |                              |           |          |

| Tape Clip           |          | Cross Tape Clamp    |          |
|---------------------|----------|---------------------|----------|
| Tape Dimension (mm) | Part No. | Tape Dimension (mm) | Part No. |
| 20x3                | UTC 203  | 20x3                | XTC 203  |
| 25x3                | UTC 253  | 25x3                | XTC 253  |
| 30x3                | UTC 303  | 30x3                | XTC 303  |
| 50x5                | UTC 505  | 50x5                | XTC 505  |
| 60x5                | UTC 605  | 60x5                | XTC 605  |

► Material: Copper & Aluminum Alloy

► Material: Copper Alloy

| Tape Clamp          |          | Connector Clamp                   |  |          |
|---------------------|----------|-----------------------------------|--|----------|
| Tape Dimension (mm) | Part No. | Main Wire Size (mm <sup>2</sup> ) | Secondary Wire Size (mm <sup>2</sup> ) | Part No. |
| 20x3                | ITC 203  | 6                                 | 1.5-6                                  | CLT 006  |
| 25x3                | ITC 253  | 10                                | 1.5-10                                 | CLT 010  |
| 30x3                | ITC 303  | 16                                | 1.5-16                                 | CLT 016  |
| 50x5                | ITC 505  | 25                                | 16-25                                  | CLT 025  |
| 60x5                | ITC 605  | 35                                | 25-35                                  | CLT 035  |
|                     |          | 50                                | 35-50                                  | CLT 050  |
|                     |          | 70                                | 35-70                                  | CLT 070  |
|                     |          | 95                                | 70-95                                  | CLT 095  |
|                     |          | 120                               | 70-120                                 | CLT 120  |
|                     |          | 150                               | 95-150                                 | CLT 150  |
|                     |          | 185                               | 120-185                                | CLT 185  |
|                     |          | 240                               | 185-240                                | CLT 240  |
|                     |          | 300                               | 240-300                                | CLT 300  |


► Material: Copper Alloy

► Material: Copper Alloy

| Wire to Plate Clamp          |          |
|------------------------------|----------|
| Wire Size (mm <sup>2</sup> ) | Part No. |
| 6-35                         | WPC 01   |
| 50-95                        | WPC 02   |
| 120-185                      | WPC 03   |
| 240-300                      | WPC 04   |

► Material: Copper Alloy

| C-Clamp              |                     |       |       |       |       |       |       |       |       |       |       |       |       |       |
|----------------------|---------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Main Conductor (mm²) | Tap Conductor (mm²) | 6     | 10    | 16    | 25    | 35    | 50    | 70    | 95    | 120   | 150   | 185   | 240   | 300   |
|                      |                     | 6     | T-11  |       |       |       |       |       |       |       |       |       |       |       |
| 10                   | T-16                | T-20  |       |       |       |       |       |       |       |       |       |       |       |       |
| 16                   | T-20                | T-26  | T-44  |       |       |       |       |       |       |       |       |       |       |       |
| 25                   | T-44                | T-44  | T-44  | T-44  |       |       |       |       |       |       |       |       |       |       |
| 35                   | T-44                | T-44  | T-60  | T-60  | T-76  |       |       |       |       |       |       |       |       |       |
| 50                   | T-60                | T-76  | T-76  | T-76  | T-98  | T-122 |       |       |       |       |       |       |       |       |
| 70                   | T-76                | T-76  | T-98  | T-98  | T-122 | T-122 | T-154 |       |       |       |       |       |       |       |
| 95                   | T-98                | T-98  | T-122 | T-122 | T-122 | T-154 | T-154 | T-190 |       |       |       |       |       |       |
| 120                  | T-154               | T-154 | T-154 | T-154 | T-190 | T-190 | T-190 | T-240 | T-240 | T-288 |       |       |       |       |
| 150                  | T-190               | T-190 | T-190 | T-190 | T-190 | T-240 | T-240 | T-240 | T-240 | T-288 | T-365 |       |       |       |
| 185                  | T-190               | T-190 | T-240 | T-240 | T-240 | T-240 | T-240 | T-288 | T-288 | T-365 | T-365 | T-365 |       |       |
| 240                  | T-240               | T-240 | T-240 | T-240 | T-240 | T-240 | T-288 | T-288 | T-288 | T-365 | T-365 | T-450 | T-450 |       |
| 300                  | T-365               | T-365 | T-365 | T-365 | T-365 | T-365 | T-450 | T-450 | T-450 | T-560 | T-560 | T-560 | T-560 | T-700 |
| 400                  |                     |       |       |       | T-450 | T-450 | T-560 | T-560 | T-560 | T-560 | T-700 | T-700 | T-700 |       |
| 500                  |                     |       |       |       | T-560 | T-700 | T-700 | T-700 | T-700 | T-700 | T-700 | T-700 | T-700 |       |



► Material: Copper

► Material: Copper

## Electronic Earth System

EES ensures static electricity is discharged to the ground by a grounding cable and continuously monitors the grounding quality. Only if the connected object is detected and grounded properly, the electronic control outputs will switch and filling release will be signaled by green, widely visible LEDs. If there is an interruption of the grounding connection, this will be shown by red LEDs, the filling process will be interrupted immediately.

|                      |                            |
|----------------------|----------------------------|
| Type of protection   | Ex II 2 G D+H2             |
| Class of temperature | T6                         |
| Protection degree    | IP66                       |
| Cable                | PU Spiral / PVC/PVC Strand |
| Power Supply         | 220 Vac 50 Hz              |

| Cable Lug                     |                              |           | Cable Lug                     |                              |            |
|-------------------------------|------------------------------|-----------|-------------------------------|------------------------------|------------|
| Cable Size (mm <sup>2</sup> ) | Hole Size (mm <sup>2</sup> ) | Part No.  | Cable Size (mm <sup>2</sup> ) | Hole Size (mm <sup>2</sup> ) | Part No.   |
| 6                             | 6                            | KLB 6/6   | 70                            | 10                           | KLB 70/10  |
|                               | 8                            | KLB 6/8   |                               | 12                           | KLB 70/12  |
| 10                            | 6                            | KLB 10/6  | 95                            | 10                           | KLB 95/10  |
|                               | 8                            | KLB 10/8  |                               | 12                           | KLB 95/12  |
| 16                            | 8                            | KLB 16/8  | 120                           | 10                           | KLB 120/10 |
|                               | 10                           | KLB 16/10 |                               | 12                           | KLB 120/12 |
| 25                            | 8                            | KLB 25/8  | 150                           | 12                           | KLB 150/12 |
|                               | 10                           | KLB 25/10 |                               | 14                           | KLB 150/14 |
| 35                            | 8                            | KLB 35/8  | 185                           | 12                           | KLB 185/12 |
|                               | 10                           | KLB 35/10 |                               | 14                           | KLB 185/14 |
| 50                            | 8                            | KLB 50/8  |                               | 12                           | KLB 240/12 |
|                               | 10                           | KLB 50/10 | 240                           | 14                           | KLB 240/14 |

► Material: Tinned Copper

| Conection to steel Structures |        |             |          |
|-------------------------------|--------|-------------|----------|
| D (mm)                        | L (mm) | Thread size | Part No. |
| 50                            | 50     | M10         | CSS5050  |
| 50                            | 40     |             | CSS5040  |
| 50                            | 30     |             | CSS5030  |
| 38                            | 32     |             | CSS5032  |
| 40                            | 32     |             | CSS5032  |

► Material: Steel Or Stainless steel





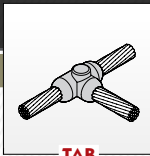


# Exothermic Welding System

Exothermic welding, is a welding process that employs molten metal to permanently join the conductors. The process employs an exothermic reaction of a thermite composition to heat the metal, and requires no external source of heat or current.

The Borna Electronics Exothermic Welding system:

- is completely portable
- makes excellent corrosion resistance and highly conductive connections
- can be used for over 50 standard connection configurations
- is cost effective
- requires no external power or heat source
- creates high quality electrical connections



## TAB S-S

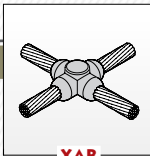
- Tap Conductor (mm²)
- Run Conductor (mm²)

| Run Conductor (mm²) \ Top Conductor (mm²) | 10,16,25 | 35    | 50    | 70    | 95    | 120   | 150   | 185   | 240   | 300   |
|---|----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 10,16,25                                  | C-45     |       |       |       |       |       |       |       |       |       |
| 35  | C-45     | C-45  |       |       |       |       |       |       |       |       |
| 50  | C-65     | C-65  | C-90  |       |       |       |       |       |       |       |
| 70  | C-65     | C-65  | C-90  | C-90  |       |       |       |       |       |       |
| 95  | C-90     | C-90  | C-90  | C-90  | C-115 | C-115 |       |       |       |       |
| 120                                       | C-90     | C-90  | C-90  | C-90  | C-115 | C-150 | C-150 |       |       |       |
| 150                                       | C-90     | C-115 | C-115 | C-115 | C-150 | C-150 | C-200 | C-200 | C-200 |       |
| 185                                       | C-115    | C-115 | C-150 | C-150 | C-150 | C-200 | C-200 | C-200 | C-250 |       |
| 240                                       |          | C-150 | C-150 | C-150 | C-200 | C-200 | C-250 | C-250 |       |       |
| 300                                       |          | C-150 | C-150 | C-150 | C-200 | C-250 | C-250 | C-250 | C-250 | C-250 |

## XAB S-S

- Tap Conductor (mm²)
- Run Conductor (mm²)

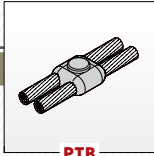
| Run Conductor (mm²) \ Top Conductor (mm²) | 10,16,25 | 35    | 50    | 70      | 95      | 120     | 150     | 185     | 240     | 300     |
|---|----------|-------|-------|---------|---------|---------|---------|---------|---------|---------|
| 10,16,35                                  | C-45     |       |       |         |         |         |         |         |         |         |
| 35  | C-65     | C-65  |       |         |         |         |         |         |         |         |
| 50  | C-90     | C-90  | C-90  |         |         |         |         |         |         |         |
| 70  |          | C-115 | C-115 | C-115   |         |         |         |         |         |         |
| 95  |          | C-115 | C-115 | C-150   | C-150   |         |         |         |         |         |
| 120                                       |          | C-115 | C-150 | C-150   | C-200   | C-200   |         |         |         |         |
| 150                                       |          | C-150 | C-150 | C-150   | C-200   | C-250   | C-200   |         |         |         |
| 185                                       |          |       | C-200 | C-200   | C-200   | C-250   | C-250   | C-200   |         |         |
| 240                                       |          |       |       | C-250   | 2*C-150 | 2*C-150 | C-200   | 2*C-200 | C-300   |         |
| 300                                       |          |       |       | 2*C-150 | 2*C-150 | 2*C-150 | 2*C-200 | 2*C-200 | 2*C-250 | 2*C-250 |



## PTB S-S

- Tap Conductor (mm²)
- Run Conductor (mm²)

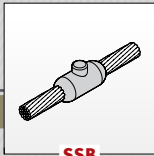
| Run Conductor (mm²) \ Top Conductor (mm²) | 10,16,25 | 35    | 50    | 70    | 95    | 120     | 150     | 185     | 240     | 300     |
|---|----------|-------|-------|-------|-------|---------|---------|---------|---------|---------|
| 10,16,25                                  | C-65     |       |       |       |       |         |         |         |         |         |
| 35  | C-65     | C-65  |       |       |       |         |         |         |         |         |
| 50  | C-65     | C-90  | C-115 |       |       |         |         |         |         |         |
| 70  |          | C-90  | C-150 | C-115 |       |         |         |         |         |         |
| 95  |          | C-115 | C-115 | C-150 | C-115 |         |         |         |         |         |
| 120                                       |          | C-115 | C-150 | C-150 | C-200 | C-150   |         |         |         |         |
| 150                                       |          | C-150 | C-150 | C-150 | C-200 | C-250   | 2*C-150 |         |         |         |
| 185                                       |          | C-150 | C-150 | C-150 | C-200 | C-250   | C-150   | C-200   |         |         |
| 240                                       |          |       | C-200 | C-200 | C-250 | C-250   | 2*C-150 | 2*C-200 | C-200   |         |
| 300                                       |          |       | C-250 | C-250 | C-250 | 2*C-150 | 2*C-150 | 2*C-200 | 2*C-250 | 2*C-250 |



## SSB S

- Conductor cross section area (mm²)

| Conductor Cross section Area | 10,16,25 | 35   | 50   | 70   | 95   | 120   | 150   | 185   | 240   | 300   |
|------------------------------|----------|------|------|------|------|-------|-------|-------|-------|-------|
| Cartridge (Gr)               | C-32     | C-45 | C-45 | C-45 | C-90 | C-115 | C-115 | C-150 | C-200 | C-250 |



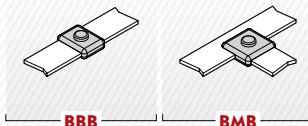
## Tools kit

A flint gun is required to start the reaction, a set of cleaning tools clean the conductors and mould.

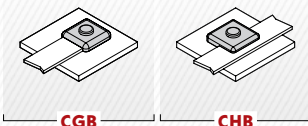
- File card brush for cleaning conductors
- Mould brush for removing slag left in the crucible after a joint has been made
- Flint gun for starting the reaction
- Mould scraper for removing slag left in the crucible after a joint has been made
- Glove
- Mould handle clamp



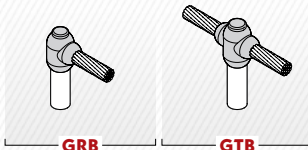
## Tape to Tape



## Tape to Plate



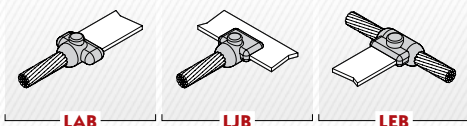
## Cable to Earth Rod



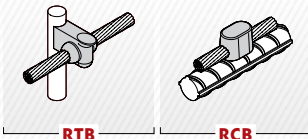
## Cable to Plate or Pipe



## Cable to Tape



## Cable to Rebar







ISO 9001  
ISO 14001  
ISO 45001  
ISO 29001  
HSE-MS

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