Kumwell



2024

# Exothermic Welding

## Product Catalog

EXO01/2024

# Vision & Mission

A lightning strike or lightning bolt is a natural disaster that can cause enormous damage to our lives, properties, buildings, and various operating systems. As our world today is a modern society in adopting and integrating information and communication technologies at home, we need stability and high security to the electronics system which can prevent lightning strikes and electromagnetic waves that pose a threat to the operating system.

## Vision

**Leader in Total Solution in Lightning Protection System and Safety Innovation with the Strongest Global Brand and Sustainable Growth.**

## Mission

- **Create value of products and services to ensure customer satisfaction.**
- **Research and develop innovation to meet the market demand.**
- **Create soft power engagement by using sustainable goals with stakeholders under the Safety to Society – CSV (Creating Shared Value) project.**
- **Develop a management system toward high-performance organization.**
- **Support human assets by creating learning culture for lifelong learning.**

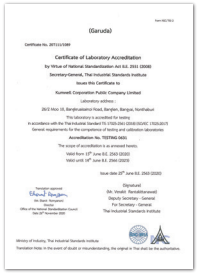
Kumwell Corporation Public Company Limited operates as a manufacturer and distributor of Grounding systems such as ground rod, exothermic welding, more effective grounding (MEG), concrete inspection pit, etc. Lightning system such as air terminal, clamp connections, etc. Surge protection system, Lightning detection and warning system, and safety innovation. We have reached the national and international standards to serve security for people's lives, assets and operating systems in all sectors, especially in the electricity sector (generating system, transmission system, distribution system, solar power plant wind power plants, etc.), the transportation sector (high-speed trains, electric trains, subways, airports, ports, expressways, expressways, etc.), the telecommunication sector (radio stations, television stations, mobile phone transmission station, data center, etc.) industrial sector (Petrochemical plant oil refinery steel mills, automobiles, electronics, farms, etc.), office, residential sectors including the security sector (arsenals, radar stations, etc.) We are proud to introduce our innovations to reduce the risk of electromagnetic and lightning damage under the name "Kumwell" guarantee from 40 countries around the world exportation and distribution.

# Quality Assurance

Our company is concerned for every step starting with the design (Pattern and production process), the right material, mechanical strength and lightning resistance test as well as being resistant to weather conditions. We take into consideration the safety of people when installing and using our product

We are committed to providing high-quality products which is an important element to the efficient and effective system work. There are product policies that have to be tested and certified according to international standards UL, IEEE, IEC and Thai Industrial Standards (TIS), especially products in lightning protection systems; it must comply with the international standard IEC 62561, which can be divided into 8 sections according to the type of products.

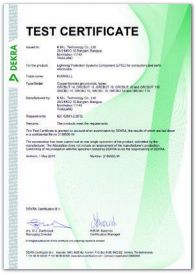
1. Requirements for connection components
2. Requirements for conductors and earth electrodes
3. Requirements for isolating spark gaps (ISG)
4. Requirements for conductor fasteners
5. Requirements for earth electrode inspection housings and earth electrode seals
6. Requirements for lightning strike counters (LSC)
7. Requirements for earthing enhancing compounds
8. Requirements for components for isolated LPS



ISO/IEC 17025-2017
(Certificate Laboratory Accreditation)



Kumwell Test Report
(IEC 62561)



DEKRA Test Certificate
(IEC 62561)



VDE Test Certificate
(IEC 61643)



UL Test Certificate
(UL 467, UL 486)

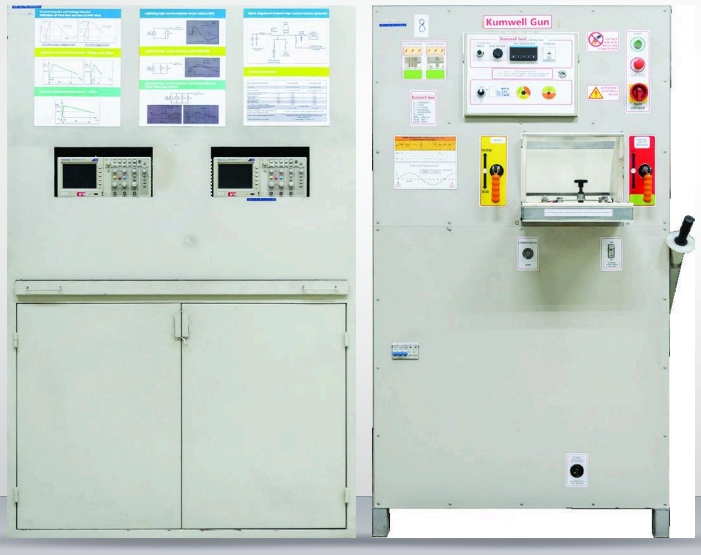


UL Inspection Type R Service Report
(For UL Listed)

To comply with the standards in order to deliver quality products, the company therefore constructed a testing laboratory (Kumwell Laboratory), as a testing room for grounding equipment, lightning protection device, surge protection device and lightning alarm devices which was completed in 2013. Our laboratory is the one and only in Southeast Asia and has been accredited for the competence of the testing laboratory according to TIS 17025 - 2561 (ISO/IEC 17025: 2017) for the general requirements in the competence of testing and calibration laboratories in the electrical field, which is recognized by the ILAC organization (International Laboratory Accreditation Cooperation) in equivalent academic ability and able to perform tests by issuing a product test certificate (Test Report) to certify that Kumwell only provide high quality products.

# Quality Assurance

Kumwell Laboratory can perform tests according to IEC 62561 and TIS 3024 standards such as Tensile Test, Electrical Resistivity Test, Load Test, Bending Test, Lightning Impulse Current / Surge Current, Environmental Test. Moreover, it is able to test equipment according to various standards such as UL. 467: Grounding and Bonding Equipment, IEC 61643: Low-Voltages Surge Protective Device (SPD).




High Lightning Impulse Current Generator
10/350 µs & 8/20 µs



High Lightning Impulse Current
Combine Generator 8/20 µs




TEMPERATURE (HUMIDITY) Test Chamber



SULFUR DIOXIDE Test Chamber



SALT SPRAY Test Chamber

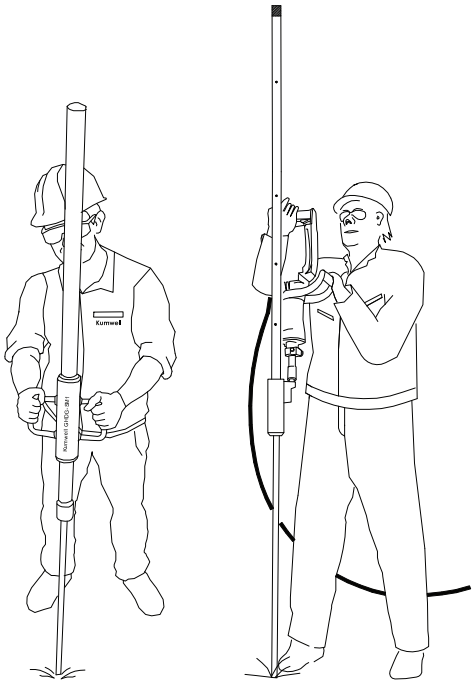
- High lightning impulse current generator for Grounding system component & Lightning protection system components (LPSC) according to IEC 62561.
- Surge impulse current generator for Surge protect ive device (SPD) according to IEC 61643.
- Environment test chamber (Temperature / Humidity / Sulphur dioxide / Salt spray) for Grounding system component & LPSC according to IEC 62561.
- Universal mechanical testing machine (Tensile / Compressive) for Grounding system component & LPSC according to IEC 62561.

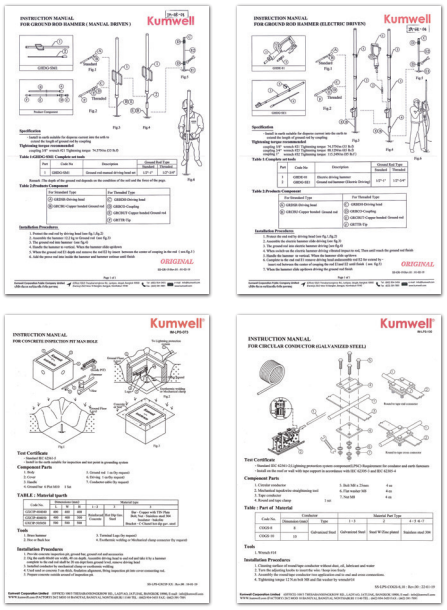
# Quality Assurance

In addition, we intend to deliver high-quality system work that is user-friendly and worth the investment besides we create a system that is efficient and completely safe.

• TOOLS & INSTRUCTION: Develop products and installation tools that are easy to install such as ground rod driving hammer, conductor strengthener machines, 4P concrete inspection pits, etc.




• INSTALL & DESIGN GUIDE: Provide manuals and installation guides through various channels such as seminars to deliver knowledge; the Kumwell Metaverse Academy, Youtube Channel: Kumwell Official, on Facebook Page: Kumwell Official and Kumwell Brand, etc.


















# Research & Development

Kumwell Corporation Public Limited Company invests in a Lightning Research Center to research and develop products of lightning protection and grounding systems including lightning detection and data processing systems. The Target of the center is to deliver quality products certified for both Thai and international standard and pay attention to the safety of users Leads to truly efficient and effective system work.

According to the risks to the safety of people and property that may be affected by electromagnetic fields and various interference waves, the investment in creating an Electromagnetic Compatibility Excellent Center (EMC Excellent Center) is done for research and academic cooperation with various agencies both within the country and abroad in order to expand the knowledge towards creating safety innovations for the social sector.

Kumwell
Lightning
Research Center

**Lightning Research Center (LRC)**

Vision

1. To be a lightning research center that has the potential to strive for sustainable excellence.
2. Become the center of a research network for exchanging knowledge on lightning systems both domestically and abroad.
3. Create innovations regarding lightning protection and lightning warning.

Kumwell
EMC
Excellent Center

**Electromagnetic Compatibility Excellent Center (EMCEC)**

Vision

1. To be an excellent center focusing on EMC activities.
2. To drive innovation with high speed based on EMC standards and related certifications.
3. To be a EMC networking and provide EMC solutionsand service to all sectors

# Innovation

Kumwell committed to research and development of products and innovations continuously and also creating collaborations with networks, partners and customers leading to the trial use and proven Technology.

**Smart Lightning Management System (SLMS)**

It is a smart innovation that can monitor the overall working status of the lightning protection system, the grounding system and the surge protection system. It can provide instant warning of threats from lightning and various electromagnetic fields to ensure the safety in life, working areas and public areas and to reduce damage.




The information will be report via Web User Interface (Client) and will be sent to the controller or central control system so it can be analyzed, examined, evaluated in order to formulate proactive maintenance measures and methods for the lightning protection system to be in perfect condition and ready to use at all times which have already been sold and installed for actual use, such as

- PTT Stadium
- PTT gas control station
- Srinagarind Dam (Characteristics of Dam & Power Plant)
- Joint research project with Electricity Generating Authority of Thailand Ubol Ratana Dam, Khon Kaen Province













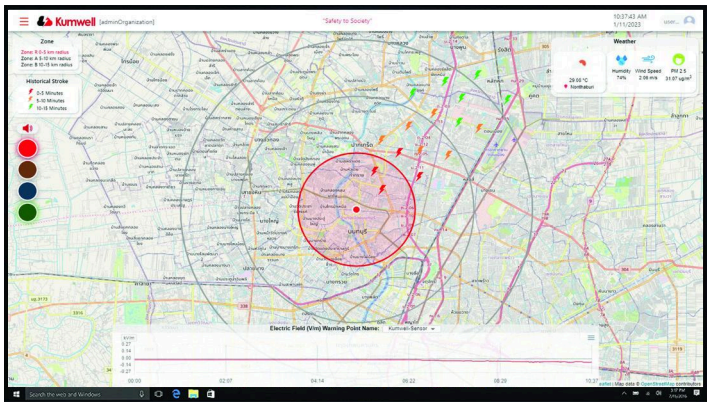
# Innovation

**Smart Lightning Warning System (SLWS)**

The company has invested in lightning detection networks throughout Thailand and some parts of the ASEAN region and has researched, developed an outstanding lightning alarm innovation until being widely accepted.

Lightning detection network is a system that uses data from two types of IOT Sensors (High-Precision Lightning Detection Network System and E-Field Sensor). They are analyzed and processed together via the intelligent Alarm Viewer Software to alert with more than 95% accuracy. It is suitable for different types of projects in the field such as golf courses, power plants, oil refineries, mine area, airport, port, amusement park, school, etc., which has already been sold and installed for actual use, such as

- Bangkok Patana School
- PTT Stadium
- PTT Global Chemical (PTTGC)
- International School Ho Chi Minh City (ISHCMC)
- Joint research project with Electricity Generating Authority of Thailand Ubol Ratana Dam, Khon Kaen Province










# Awards

**SET Awards 2022**

Received the Best Company Performance Awards in SET Awards 2022 in the category of Business Excellence for information disclosure and quality of financial statements and Sustainability Excellence in the Thai capital market's prestigious awards ceremony 2022 (SET Awards 2022) which emphasizes the strength of policies and effective business practices. Best Company Performance Awards by the Stock Exchange of Thailand (SET) is an award given to listed companies with excellent performance in each group based on business performance, good corporate governance and compliance with the regulations of the Stock Exchange of Thailand.




Best CEO Awards

Best Company Performance Awards







**Asia Pacific Enterprise Award (APEA) 2023**

Kumwell Corporation PLC., led by Mr. Boonsak Kiatjaroonlert, CEO Received two major international awards, including the Master Entrepreneur Award, as a leader with determination and success in driving the organization to the point of creating continuous business growth. And the Corporate Excellent Award, which is an award given to organizations that have outstanding performance in management and business growth from the Asia Pacific Enterprise Award (APEA) stage. Both of these awards It is supported by Asia Pacific Enterprise aims to band leading entrepreneurs and organisations across Asia to spur greater innovation, fair practices and growth in entrepreneurship, creating a successful entrepreneurial ecosystem which will then shape Asia to sustainable economic and social growth. It can be considered an award of pride and reinforces the image of success and readiness to deliver safety to society in a sustainable way.








# Sustainability

Kumwell Corporation Public Company Limited is committed to conducting business by integrating with sustainability management by adopting an international approach to setting strategies and driving the organization to meet the needs and expectations of stakeholders throughout the Value chain for more than 10 years includes:




**ESG risk consists of 3 aspects: environmental, social and governance. The company sets goals and action plans in each aspect for example;**

## E: Environmental

- Invest in Solar Power, a clean alternative energy source instead of using thermal energy from gas which can cause greenhouse gasses.
- Invested in a Zero Liquid Discharge wastewater treatment system to eliminate effluents and reuse water from industrial processes.

## S: Social

- Collaborate with the Council of Engineers to deliver knowledge and expertise on electromagnetic disaster risk reduction under Kumwell Academy.
- Create activities to deliver knowledge and help strengthen local economy such as the policy to employ people in the community nearby, organize training and practice financial management knowledge with Noburo, etc.

## G: Governance

To emphasize the efficient and effective in corporate governance practices of the company;

- Received prestigious SET Awards 2022, Asia Pacific Enterprise Awards (APEA) 2023
- Setting up a sustainability, a risk management, and a good corporate governance committee, etc.

**SDGs - Sustainable Development Goals**

There are 17 goals, divided into 5 dimensions: the environment dimension (Planet), the social dimension (People), the economic dimension (Prosperity), the peace and institute dimension (Peace), and the development partnership dimension (Partnership). Our company has set goals and dimensions as follows




- **Planet dimension** 13th goal: Climate Action
  - Propose solutions for disasters caused by electromagnetic waves such as lightning under 3rd approach: CSV.

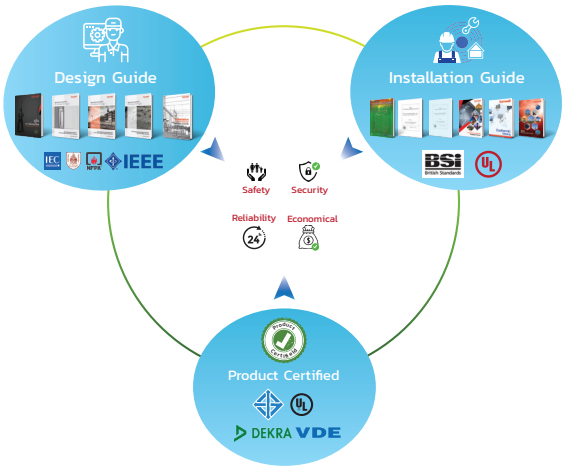
- **Prosperity dimension** 11th goal: Sustainable cities and communities
  - MOU with various agencies in Research and development to create safety innovations for reducing disasters caused by electromagnetic waves.

- **People dimension** 4th goal: Quality Education
  - Kumwell has developed the value of human assets, both corporate inside and outside

# Sustainability

CSV - Creating Shared Value is a way to drive value to society and business sector to achieve stable and sustainable growth. Kumwell has operated through the sustainability commitment "CSV - Safety to Society" project for more than 10 years in delivering knowledge and expertise to reduce life, property, and operating systems in all sectors damage and extending to cooperation with partners networks and clients such as

- Collaborate with the Council of Engineers under the project Kumwell Academy to upgrade the engineering profession and deliver safety to society.
- Sign a Memorandum of Understanding (MOU) with government and private agencies on lightning protection and safety innovations. In the test installation and create innovation to increase efficiency and effectiveness in the operating system. Reduce the risk of electromagnetic waves. Along with certifying the use of products (Proven Technology).
- Join the education sector to create an Engineering curriculum, system design handbook, and installation guide.
- Collaborate with the Thai Electrical and Mechanical Contractors Association (TEMCA) to implement a project "TEMCA Corporate Creating Shared Value (TEMCA C CSV)".






# Selection Chart

## Cable to Cable

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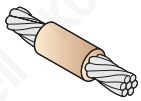
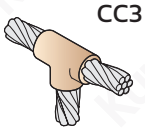
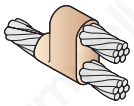
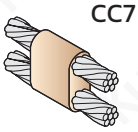
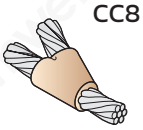
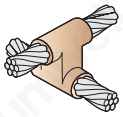
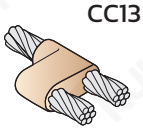
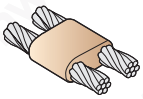
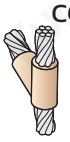
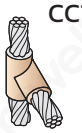
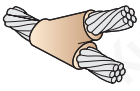
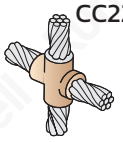
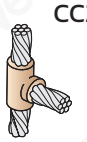
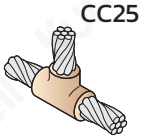
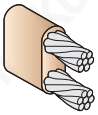
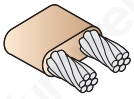
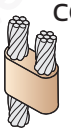
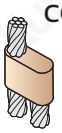
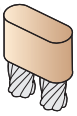
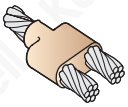
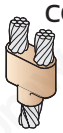
| CC1  Page 7 | CC2  Page 8 | CC3  See Note | CC4  Page 9 | CC5  See Note | CC6  Page 10 | CC7  Page 11 | CC8  See Note |
| CC11  Page 12 | CC13  Page 13 | CC14  Page 14 | CC17  See Note | CC18  See Note | CC19  See Note | CC20  See Note | CC22  See Note |
| CC23  See Note | CC24  See Note | CC25  See Note | CC26  See Note | CC27  See Note | CC28  See Note | CC29  See Note | CC30  See Note |
| CC31  See Note | CC33  See Note | CC34  Page 15 | CC35  See Note | CC36  See Note | CC37  See Note | CC38  See Note | CC39  See Note |

## Cable to Busbar

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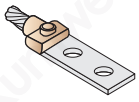
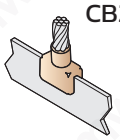
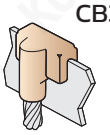
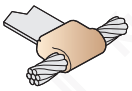
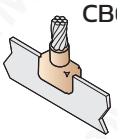
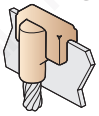
| CB1 (Lug)  Page 16 | CB1  Page 17 | CB2  See Note | CB3  See Note | CB4  Page 18 | CB5  Page 19 | CB6  See Note | CB7  See Note |
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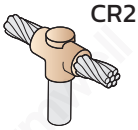
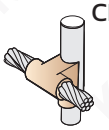
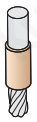
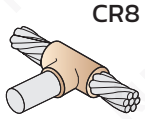
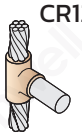
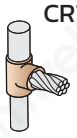
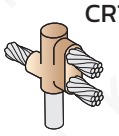
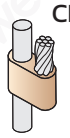
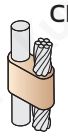
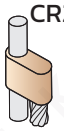
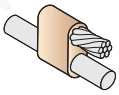
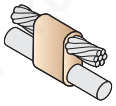
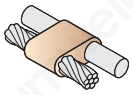
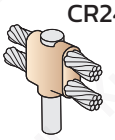
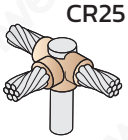
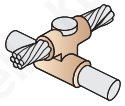
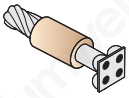
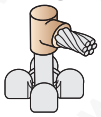
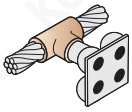
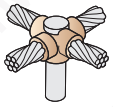
| CB19  See Note | CB20  See Note | CB21  See Note | CB22  See Note | CB23  See Note | CB24  See Note | CB25  See Note | CB26  See Note |
| CB27  See Note | CB28  See Note | CB29  Page 20 | CB30  See Note | CB31  See Note | CB32  See Note | CB34  Page 21 | CB38  See Note |

CB6, CB7 clearance behind bar 3/4" - 5"
CB34 used for signal reference ground grid copper strip ≤ 0.6 mm. thick.

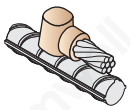
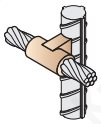
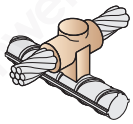
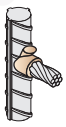
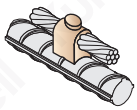
Note: Special requirement can be requested.

# Selection Chart

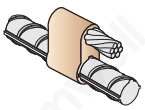
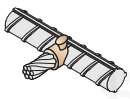
## Cable to Ground Rod

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| CR1  Page 22 | CR2  Page 23 | CR3  Page 24 | CR5  See Note | CR6  See Note | CR7  See Note | CR8  See Note | CR9  See Note |
| CR12  See Note | CR13  See Note | CR14  See Note | CR15  See Note | CR16  See Note | CR17  Page 25 | CR18  See Note | CR19  See Note |
| CR20  See Note | CR21  See Note | CR22  See Note | CR23  See Note | CR24  Page 26 | CR25  Page 27 | CR26  See Note | CR27  See Note |
| CR29  See Note | CR30  See Note | CR31  See Note | CR32  See Note | CR33  Page 28 | | | |

## Cable to Rebar (Partially Wrapped)

| | | |
|---|---|---|
| CRE1P  Page 29 | CRE3P  Page 30 | CRE4P  Page 31 |
| CRE5P  See Note | CRE6P  Page 32 | CRE17P  Page 33 |
| CRE18P  Page 34 | CRE19P  Page 35 | CRE20P  Page 36 |

## Cable to Rebar (Fully Wrapped)

| | | | |
|---|---|---|---|
| CRE1  Page 37 | CRE2  Page 38 | CRE6  Page 39 | CRE7  See Note |
| CRE8  See Note | CRE9  See Note | CRE11  See Note | CRE12  See Note |
| CRE13  See Note | CRE14  See Note | CRE15  See Note | CRE16  See Note |
| CRE17  Page 40 | CRE18  Page 41 | CRE19  Page 42 | CRE20  Page 43 |

## Rebar to Rebar

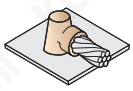
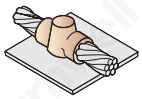
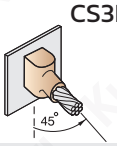
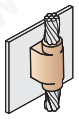
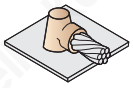
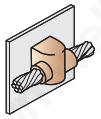
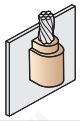
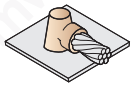
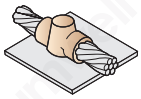
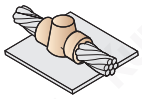
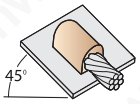
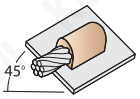
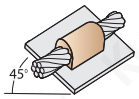
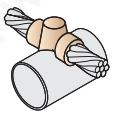
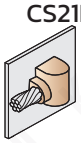
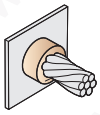
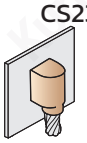
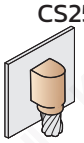
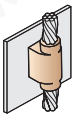
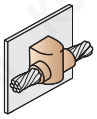
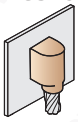
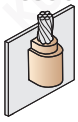
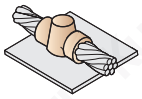
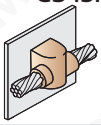
| | |
|---|---|
| RE1  Page 89 | RE2  Page 90 |

CR should be used with Kumwell ground rod standard type without threaded.

Note: Special requirement can be requested.

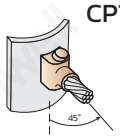
# Selection Chart

## Cable to Steel

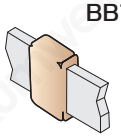
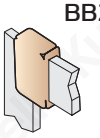
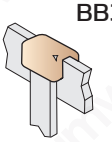
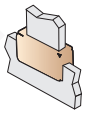
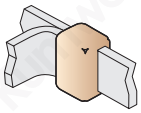
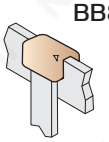
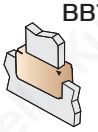
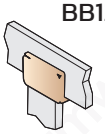
| | | | | | | | |
|---|---|---|---|---|---|---|---|
| CS1F  Page 44 | CS2F  Page 45 | CS3F   Page 46 | CS4F  Page 47 | CS5NC  See Note | CS6F  Page 48 | CS7N  Page 49 | CS8N  Page 50 |
| CS9N  Page 51 | CS11NC  See Note | CS12N   See Note | CS13N   See Note | CS14N   See Note | CS15N   See Note | CS16  See Note | CS18N  See Note |
| CS21NC  See Note | CS22  See Note | CS23F  Page 52 | CS24F  See Note | CS25N  Page 53 | CS26N  See Note | CS27N  Page 54 | CS28FC   See Note |
| CS29NC  See Note | CS30NC  See Note | CS31F  See Note | CS42FC  See Note | CS43FC  See Note | | | |

Note: CSn | – | None
| C | Cast iron
N = On surface
F = Off surface

## Cable to Pipe

CP1   Page 55-56

## Busbar to Busbar

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| BB1  Page 57 | BB2  Page 58 | BB3  Page 59 | BB4  See Note | BB5  See Note | BB6  See Note | BB7  Page 60 | BB8  See Note |
| BB11  See Note | BB12  See Note | BB14  Page 61 | BB17  See Note | BB20  See Note | BB21  See Note | BB22  See Note | BB27  See Note |
| BB28  See Note | BB29  See Note | BB40  Page 62 | BB41  Page 63 | BB43  See Note | BB44  See Note | BB45  See Note | BB46  See Note |

## Busbar to Ground Rod

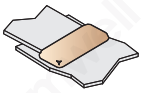
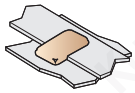
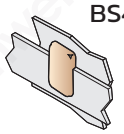
| | | | | | | | |
|---|---|---|---|---|---|---|---|
| BR1  Page 64 | BR2  Page 65 | BR4  Page 66 | BR7  Page 67 | BR8  See Note | BR9  See Note | BR11  See Note | BR12  See Note |

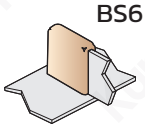
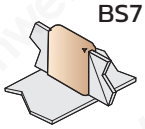
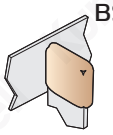
BB8, BB11, BB28, BB29 clearance behind bar 3/4" – 5"
BB44, BB45, BB46 used for signal reference ground grid copper strip ≤ 0.6 mm. thick.
BR should be used with Kumwell ground rod standard type without threaded.

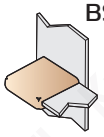
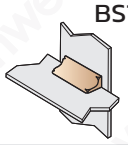
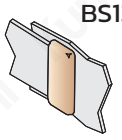
Note: Special requirement can be requested.

# Selection Chart

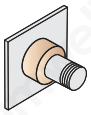
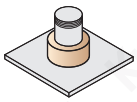
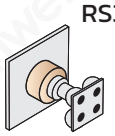
## Cable to Steel

| BS1 | BS2 | BS3 | BS4 |
|---|---|---|---|
|  |  |  |  |
| Page 68 | Page 69 | Page 70 | Page 71 |

| BS5 | BS6 | BS7 | BS8 |
|---|---|---|---|
|  |  |  |  |
| See Note | See Note | See Note | See Note |

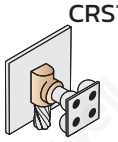
| BS9 | BS11 | BS13 |
|---|---|---|
|  |  |  |
| See Note | See Note | See Note |

## Copper or Steel Stud to Steel

| RS1 | RS2 | RS3 |
|---|---|---|
|  |  |  |
| Page 72 | Page 73 | Page 74 |

## Ground Plates to Cable & Steel

| RC1 | RC2 |
|---|---|
|  |  |
| Page 75 | Page 76 |

| CRS1 | CRS2 |
|---|---|
|  |  |
| Page 77 | Page 78 |

## CGR

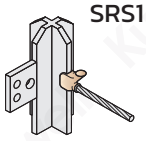
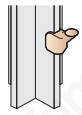
| AC1 | AC2 |
|---|---|
|  |  |
| Page 79 | Page 80 |

## CGRG

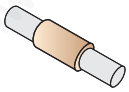
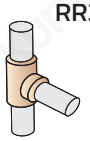
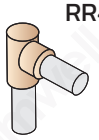
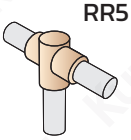
| AR1 |
|---|
|  |
| Page 83 |

| ACR1 | ACR2 |
|---|---|
|  |  |
| Page 81 | Page 82 |

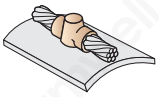
## Steel Cable to Steel Rod

| SRS1 | SRS2 |
|---|---|
|  |  |
| Page 91 | See Note |

## Ground Rod to Ground Rod

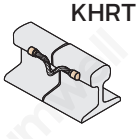
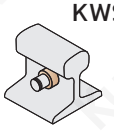
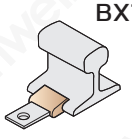
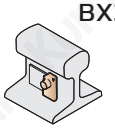
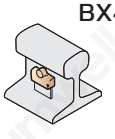
| RR1 | RR2 | RR3 | RR4 | RR5 |
|---|---|---|---|---|
|  |  |  |  |  |
| Page 84 | Page 85 | Page 86 | Page 87 | Page 88 |

## Cathodic Protection

| CA1 | CA2 |
|---|---|
|  |  |
| Page 108 | Page 109 |

| CA3 |
|---|
|  |
| Page 110 |

## Railway Application

| KWRT (R/L) | KHRT | KWS | BX1 | BX3 | BX4 |
|---|---|---|---|---|---|
|  |  |  |  |  |  |
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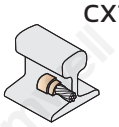
| CX1 | CX2 | CX5 | CX7 | CX8 | CX10 | CX11 |
|---|---|---|---|---|---|---|
|  |  |  |  |  |  |  |
| Page 100 | Page 101 | Page 102 | Page 103 | Page 104 | See Note | See Note |

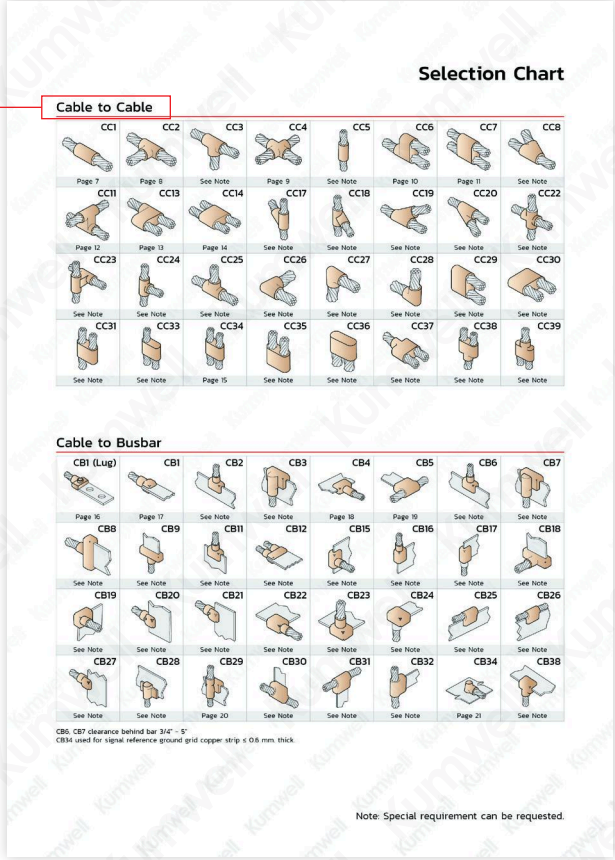
CGR = Cable to Grounding Receptacle
CGRG = Cable & Grounding Receptacle to Ground Rod
CGR, CGRG and RR should be used with Kumwell ground rod standard type without threaded.

Note: Special requirement can be requested.

# How to Order

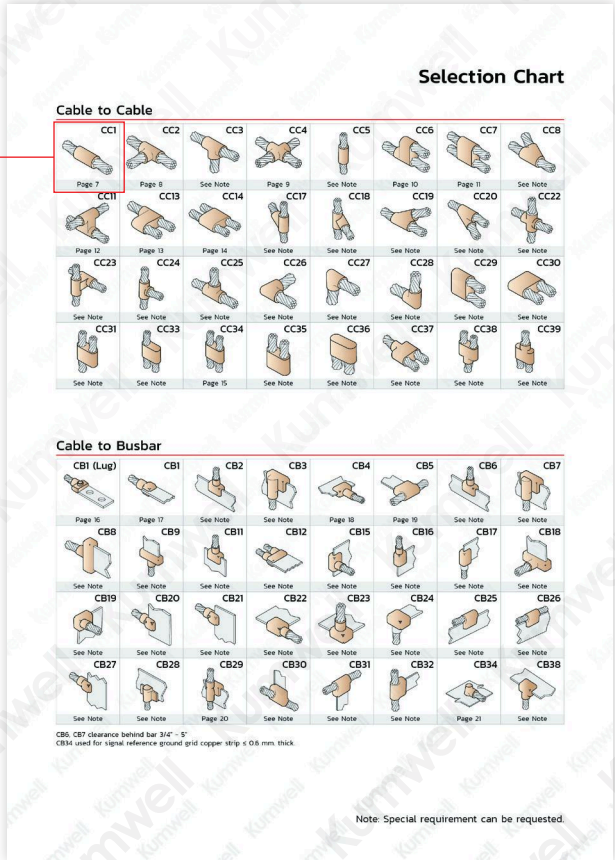
1. Search connection type in selection chart as your design

   • Special connection can be requested




2. Search application type and then go to the page number in the corner of picture box

   • Special application can be requested



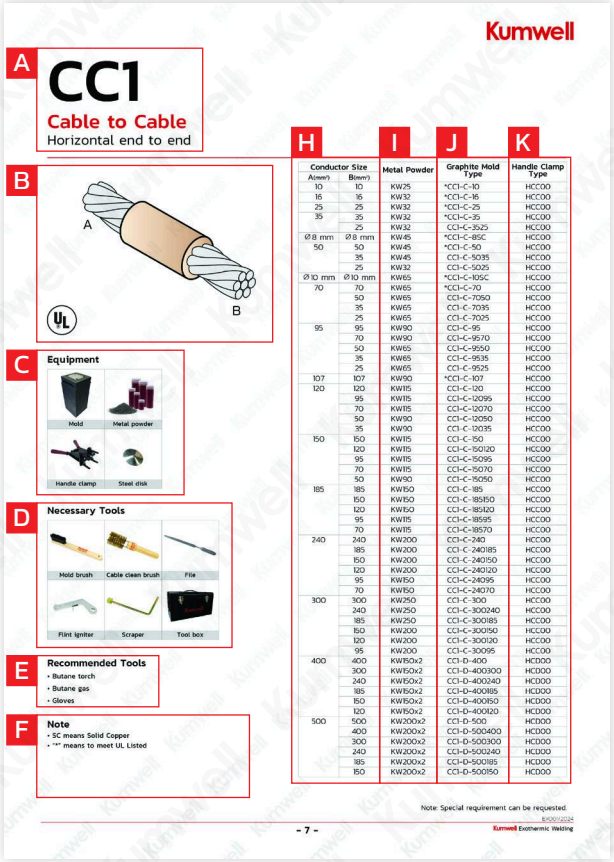
# How to Order

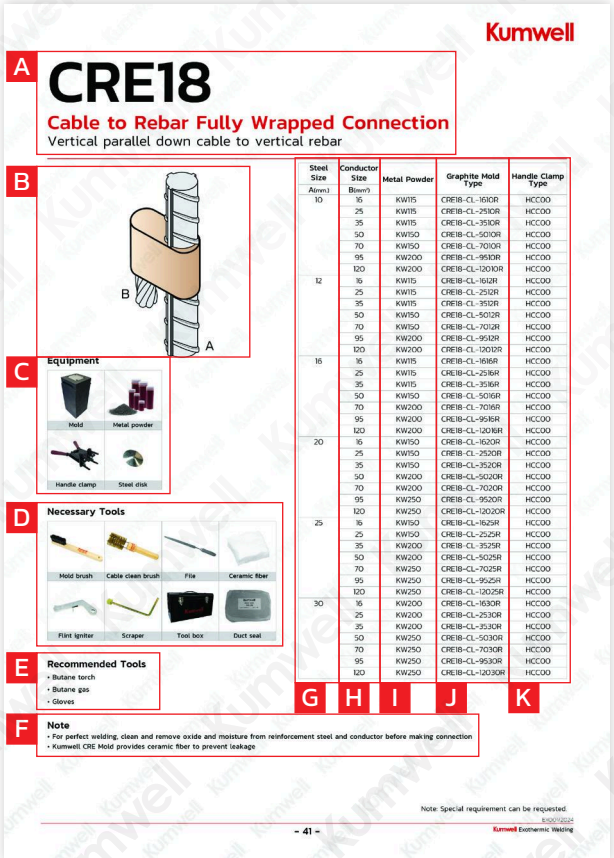
3. Search further details in the table which match to your requirement sush as

- The cable size, bus bar size, etc.
- The ground rod size, e.g., 5/8", 3/4", etc.
- The rebar size, e.g., 20 mm, 40 mm diameter, etc.

4. Special connection can be requested

- Heavy-duty type
- Cable
  - Special size, e.g., 140 mm$^2$, 200 mm$^2$, 630 mm$^2$, etc.
  - Special size, e.g., AWG, Flexible Braid, etc.
  - Special design for special connection.
- Ground rod
  - Special size, e.g., 14 mm, 20 mm, 40 mm, etc.
  - Special size, e.g., stainless steel rod, copper pipe, stainless steel pipe, etc.
- K-MAX
  - K-MAX System see page
- For special requement, please contact our technical department
  E-mail : info@kumwell.com
  Tel : (662)-954-3455
  Fax : (662)-591-7891




| | |
|---|---|
| A | Type of Connection |
| B | Sample Connection |
| C | Equipment |
| D | Necessary Tools |
| E | Recommended Tools |
| F | Information |
| G | Size of Rod or Rebar |
| H | Size of Conductor |
| I | Size of Weld Metal Powder |
| J | Mold Type |
| K | Handle Clamp Type |

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| | |
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| **22 - 28** | CR1 – CR33: Cable to Ground Rod |
| **29 - 36** | CRE1P – CRE20P: Cable to Rebar Partially Wrapped Connection |
| **37 - 43** | CRE1 – CRE20: Cable to Rebar Fully Wrapped Connection (P.36) |
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| **83** | AR1: Grounding Receptacle to Ground Rod |
| **84 - 88** | RR1 – RR5: Ground Rod to Ground Rod |
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| **94** | KWRT: Cable to Web Rail |

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| | |
|---|---|
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| 105 | Conductors |
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| 115 | CC4 |
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| **128** | **Instruction Standard Mold Type** |
| **129** | **Instruction One Time System** |
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| 135 - 139 | International Project Reference |

Kumwell

# K-MAX

## ELECTRONIC IGNITOR – ULTRA SAFETY

K-MAX is an innovative system that provides a safer and easier exothermic welding process. Eliminates the need for ignition by Flint Gun in traditional way. K-MAX enables safe ignition from a safety distance and reducing exposure to smoke and flame.
Trust in K-MAX to provide a robust solution to ensure the safety and integrity of your grounding system.






ELECTRICITY






TELECOMMUNICATION



INDUSTRIAL

TRANSPORTATION



BUILDING

Kumwell

# K-MAX

## ELECTRONIC IGNITOR – ULTRA SAFETY

**K-MAX System Includes**

- K-MAX Elitor: Remote electronic ignitor with 1.8m cable cord
- K-MAX Mold: Graphite mold for specific connection type
- K-MAX Powder: Moisture-Resistance packed and sealed cartridge



**K-MAX Elitor**



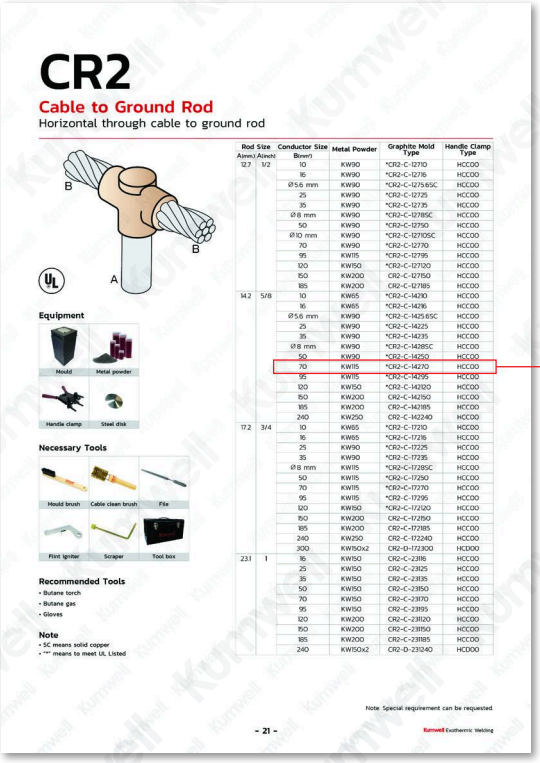
**K-MAX Mold**



**K-MAX Powder**

**How to Order**

1. To order K-MAX system is simple, can be use a reference code from Kumwell Exothermic Welding Catalog and change the code of powder and mold.



CR2

Cable to Ground Rod

Horizontal through cable to ground rod

| Rod Size A(mm.) | Rod Size A(inch) | Conductor Size B(mm²) | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|---|---|
| 14.2 | 5/8 | 70 | KW115 | *CR2-C-14270 | HCC00 |

**Metal Powder**

| | |
|---|---|
| **Standard Powder**: | KW115 |
| **K-MAX Powder**: | KW115M |

**Graphite Mold Type**

| | |
|---|---|
| **Standard Mold**: | CR2-C-14270 |
| **K-MAX Mold**: | CR2-CM-14270 |

**Handle Clamp**

| | |
|---|---|
| **Standard Handle Clamp**: | HCC00 |
| **K-MAX Handle Clamp**: | HCC00 |

2. K-MAX Powder related to KW powder as below

| KW Powder | KW65 | KW90 | KW115 | KW150 | KW200 | KW250 |
|---|---|---|---|---|---|---|
| K-MAX Powder | KW65M | KW90M | KW115M | KW150M | KW200M | KW250M |

# KW Weld metal powder

## For Grounding & Lightning Protection Systems



Kumwell weld metal powder KW type is exothermic welding connection process for grounding and lightning protection system must maintain a low contact resistance often under adverse conditions for the expected lifetime. Connections in grounding and lightning protection system network are subjected to serve corrosion, high mechanical stress due to electromagnetic force, and rapid thermal heating due to high current magnitude during fault conditions.

**Applications**

Suitable for typical installation in grounding and lightning protection's connections their fore copper to copper, copper to steel, steel to steel, copper to stainless steel, and stainless steel to stainless steel.

**Standards**

- UL 467 - Standard for Grounding & Bonding Equipment.
- IEEE 837 - Standard for Qualifying Permanent Connections used in Substation Grounding.
- IEC 62561-1 - Lightning Protection Systems Component (LPSC) for connection components.

**Criteria of Test** Kumwell Exothermic welding conections have been successfully tested in accordance with;

**• IEEE Std. 837 Standard for Qualifying Permanent Connection (For type test product)**

1. Mechanical pullout test
2. Electromagnetic force
3. Sequential test group has 3 main procedures to test each if it passes the set standard of each procedure;
   a. Current Temperature Cycling b. Freeze Thaw Cycling c. Corrosion Sequence Run: Salt Spray Test, Acid Test

**• UL 467 Standard for Grounding & Bonding Equipment/UL Inspection Witness**

1. Weld metal powder quality: Percentage of material, Particle size, Density of each compostion, Starting powder and ignition
2. Reaction: Steady burn, No pop, No drastic color change, No porosity in the resulting copper, Consistency of color
3. Shot Time Current Test
4. Mechanical Sequence from UL 486

**• American Railway Engineering and Maintenance-of-way Association (AREMA)**

Test methods for tensile testing of metallic material evaluate the consistency chemistry and overall quality of KW, KB and KR Welding material resulting to the average of 43,000 psi tensile strength.

**• IEC 62561-1 Lightning Protection Systems Component (LPSC) for connection component**

1. Environmental Test: Salt Spray Test, Humid Sulphurous atmosphere test.
2. Electrical Test: Lightning Impulse Current Test, Contact Resistance Measurement
3. Static Mechanical Test: Tensile Test

Kumwell

# KW Weld metal powder

## For Grounding & Lightning Protection Systems



High Lightning Impulse Current Generator 10/350 μs & 8/20 μs

High Lightning Impulse Current Combine Generator 8/20 μs

TEMPERATURE (HUMIDITY) Test Chamber

SULFUR DIOXIDE Test Chamber

SALT SPRAY Test Chamber



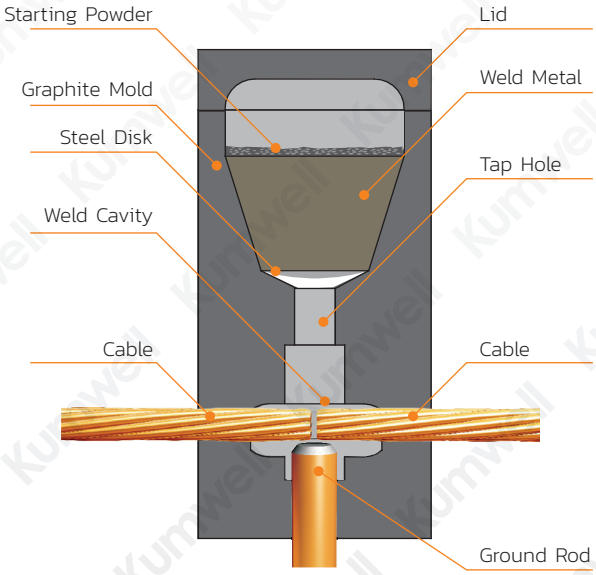
### Quality Assurance

Kumwell also is internationally recognized for high standard of its graphite mold and the exothermic welding powder from successfully passed the control test in accordance with the UL467 Standard for Grounding and Bonding Equipment/UL Inspection Witness.

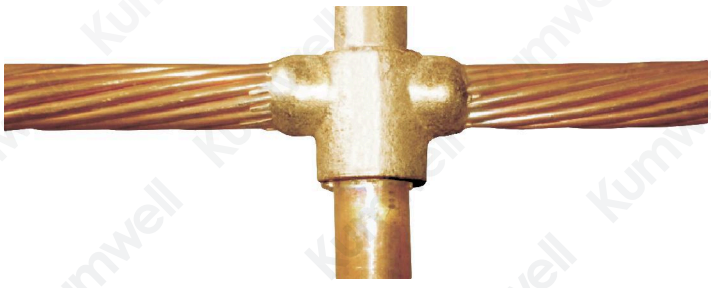



### Process

Kumwell Exothermic Welding process is a molecular chemical reaction between copper oxide and aluminum, generating a tremendous superheat with molten metals reaching approximately temperatures of 2,537 °C (4,598 °F). The process can be completed itself automatically without external source of power or heat.




$3Cu_2O+2Al \longrightarrow 6Cu+Al_2O_3$



Completed Connection

# KW Weld metal powder

## For Grounding & Lightning Protection Systems

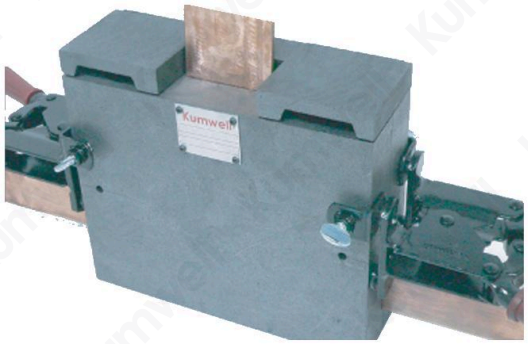
**Graphite Mold**

Kumwell's exothermic welding mold made from high quality graphite material. From expert engineering to accurate manufacturing process followed the UL International Standards result in earnest design for cavity and flow path, accurate tolerance, professional design and long service life. Moreover, Kumwell can customize mold made to order.

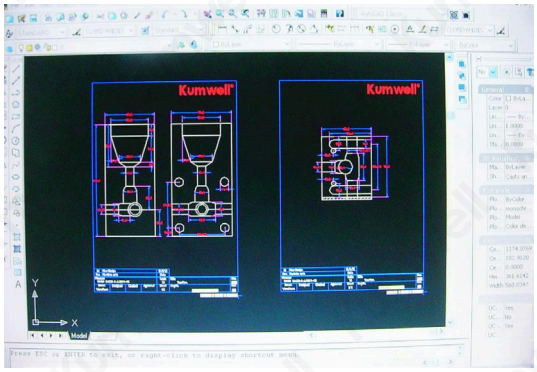
- Earnest design: cavity, flow path
- High quality raw material
- Accurate tolerance
- Duration: at least 50 times in normal usage








BB11-WC-508508: 50x8 mm² Copper bar to 50x8 mm² Copper bar




Graphite Mold designs by computer programs.

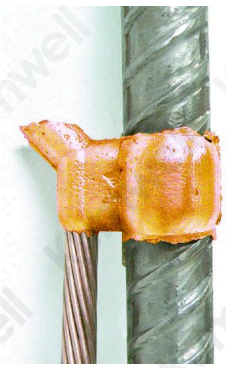
**Safety starting and weld metal powder**

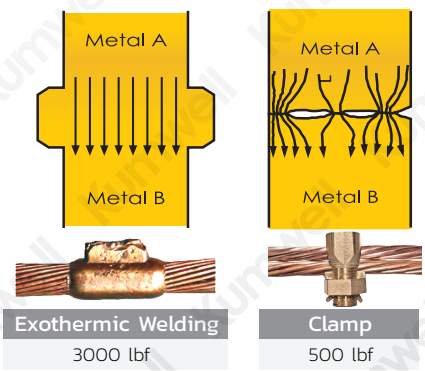
- Nontoxic and heavy metal
- Non self-ignite
- Ignition temperature at least 400°C
- Smooth reaction
- Steady burn without pop and fire out
- No slag and porosity
- Consistency of color
- High conductivity

**Technical Comparison**

Exothermic welding withstands about 5 times higher than clamp's connection in mechanical force.

Unlike compression and bolt clamp, exothermic welded joint become homogeneous metal.





Kumwell

# KW Weld metal powder

## For Grounding & Lightning Protection Systems

**Packaging**

Kumwell weld metal powder is contained a moisture-resistant plastic cartridge, packed in a paper box. Integral weld metal package is identified as to the weld metal powder's amount, type of metal powder to be connected, Lot No., the number of tubes to manufacturing date (MFD).

| Code | KW15 | KW25 | KW32 | KW45 | KW65 | KW90 | KW115 | KW150 | KW200 | KW250 |
|---|---|---|---|---|---|---|---|---|---|---|
| Tubes/box | 40 | 20 | 20 | 20 | 20 | 20 | 10 | 10 | 10 | 10 |

**Storage**

It should be stored at ambient temperature and kept away from moisture.







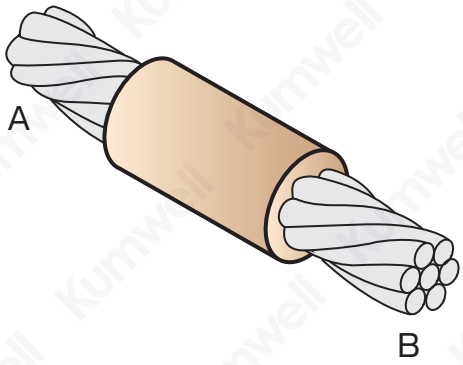




# CC1

## Cable to Cable

Horizontal end to end




### Equipment




### Necessary Tools




### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

- SC means Solid Copper
- "*" means to meet UL Listed

| Conductor Size | | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|---|
| A(mm²) | B(mm²) | | | |
| 10 | 10 | KW25 | *CC1-C-10 | HCC00 |
| 16 | 16 | KW32 | *CC1-C-16 | HCC00 |
| 25 | 25 | KW32 | *CC1-C-25 | HCC00 |
| 35 | 35 | KW32 | *CC1-C-35 | HCC00 |
| | 25 | KW32 | CC1-C-3525 | HCC00 |
| Ø8 mm | Ø8 mm | KW45 | *CC1-C-8SC | HCC00 |
| 50 | 50 | KW45 | *CC1-C-50 | HCC00 |
| | 35 | KW45 | CC1-C-5035 | HCC00 |
| | 25 | KW32 | CC1-C-5025 | HCC00 |
| Ø10 mm | Ø10 mm | KW65 | *CC1-C-10SC | HCC00 |
| 70 | 70 | KW65 | *CC1-C-70 | HCC00 |
| | 50 | KW65 | CC1-C-7050 | HCC00 |
| | 35 | KW65 | CC1-C-7035 | HCC00 |
| | 25 | KW65 | CC1-C-7025 | HCC00 |
| 95 | 95 | KW90 | CC1-C-95 | HCC00 |
| | 70 | KW90 | CC1-C-9570 | HCC00 |
| | 50 | KW65 | CC1-C-9550 | HCC00 |
| | 35 | KW65 | CC1-C-9535 | HCC00 |
| | 25 | KW65 | CC1-C-9525 | HCC00 |
| 107 | 107 | KW90 | *CC1-C-107 | HCC00 |
| 120 | 120 | KW115 | CC1-C-120 | HCC00 |
| | 95 | KW115 | CC1-C-12095 | HCC00 |
| | 70 | KW115 | CC1-C-12070 | HCC00 |
| | 50 | KW90 | CC1-C-12050 | HCC00 |
| | 35 | KW90 | CC1-C-12035 | HCC00 |
| 150 | 150 | KW115 | CC1-C-150 | HCC00 |
| | 120 | KW115 | CC1-C-150120 | HCC00 |
| | 95 | KW115 | CC1-C-15095 | HCC00 |
| | 70 | KW115 | CC1-C-15070 | HCC00 |
| | 50 | KW90 | CC1-C-15050 | HCC00 |
| 185 | 185 | KW150 | CC1-C-185 | HCC00 |
| | 150 | KW150 | CC1-C-185150 | HCC00 |
| | 120 | KW150 | CC1-C-185120 | HCC00 |
| | 95 | KW115 | CC1-C-18595 | HCC00 |
| | 70 | KW115 | CC1-C-18570 | HCC00 |
| 240 | 240 | KW200 | CC1-C-240 | HCC00 |
| | 185 | KW200 | CC1-C-240185 | HCC00 |
| | 150 | KW200 | CC1-C-240150 | HCC00 |
| | 120 | KW200 | CC1-C-240120 | HCC00 |
| | 95 | KW150 | CC1-C-24095 | HCC00 |
| | 70 | KW150 | CC1-C-24070 | HCC00 |
| 300 | 300 | KW250 | CC1-C-300 | HCC00 |
| | 240 | KW250 | CC1-C-300240 | HCC00 |
| | 185 | KW250 | CC1-C-300185 | HCC00 |
| | 150 | KW200 | CC1-C-300150 | HCC00 |
| | 120 | KW200 | CC1-C-300120 | HCC00 |
| | 95 | KW200 | CC1-C-30095 | HCC00 |
| 400 | 400 | KW150x2 | CC1-D-400 | HCD00 |
| | 300 | KW150x2 | CC1-D-400300 | HCD00 |
| | 240 | KW150x2 | CC1-D-400240 | HCD00 |
| | 185 | KW150x2 | CC1-D-400185 | HCD00 |
| | 150 | KW150x2 | CC1-D-400150 | HCD00 |
| | 120 | KW150x2 | CC1-D-400120 | HCD00 |
| 500 | 500 | KW200x2 | CC1-D-500 | HCD00 |
| | 400 | KW200x2 | CC1-D-500400 | HCD00 |
| | 300 | KW200x2 | CC1-D-500300 | HCD00 |
| | 240 | KW200x2 | CC1-D-500240 | HCD00 |
| | 185 | KW200x2 | CC1-D-500185 | HCD00 |
| | 150 | KW200x2 | CC1-D-500150 | HCD00 |

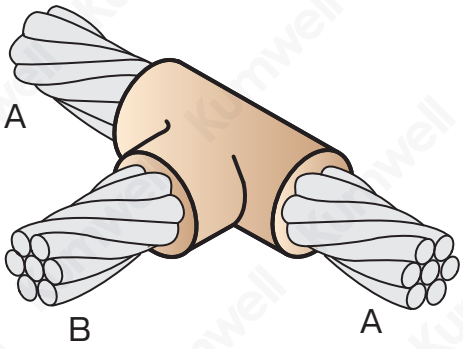
Note: Special requirement can be requested.

Kumwell

# CC2

## Cable to Cable

Horizontal cable tap to horizontal cable run




### Equipment


Mold


Metal powder


Handle clamp


Steel disk

### Necessary Tools


Mold brush


Cable clean brush


File


Flint igniter


Scraper



Tool box

### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

- SC means Solid Copper
- "*" means to meet UL Listed

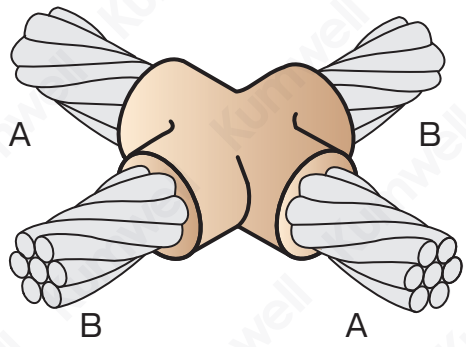
| Conductor Size A(mm²) | Conductor Size B(mm²) | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|---|
| 10 | 10 | KW32 | *CC2-C-1010 | HCC00 |
| 16 | 16 | KW45 | *CC2-C-1616 | HCC00 |
| 25 | 25 | KW45 | *CC2-C-2525 | HCC00 |
| Ø5.6 mm | Ø5.6 mm | KW45 | *CC2-C-5.6SC5.6SC | HCC00 |
| 35 | 35 | KW45 | *CC2-C-3535 | HCC00 |
| | 25 | KW45 | *CC2-C-3525 | HCC00 |
| Ø8 mm | Ø8 mm | KW65 | *CC2-C-8SC8SC | HCC00 |
| 50 | 50 | KW90 | *CC2-C-5050 | HCC00 |
| | 35 | KW45 | *CC2-C-5035 | HCC00 |
| | 25 | KW45 | *CC2-C-5025 | HCC00 |
| Ø10 mm | Ø10 mm | KW90 | *CC2-C-10SC10SC | HCC00 |
| 70 | 70 | KW90 | *CC2-C-7070 | HCC00 |
| | 50 | KW90 | *CC2-C-7050 | HCC00 |
| | 35 | KW45 | *CC2-C-7035 | HCC00 |
| | 25 | KW45 | *CC2-C-7025 | HCC00 |
| 95 | 95 | KW115 | *CC2-C-9595 | HCC00 |
| | 70 | KW90 | *CC2-C-9570 | HCC00 |
| | 50 | KW90 | *CC2-C-9550 | HCC00 |
| | 35 | KW90 | *CC2-C-9535 | HCC00 |
| | 25 | KW90 | *CC2-C-9525 | HCC00 |
| 120 | 185 | KW150 | CC2-C-120185 | HCC00 |
| | 120 | KW150 | *CC2-C-120120 | HCC00 |
| | 95 | KW150 | *CC2-C-12095 | HCC00 |
| | 70 | KW90 | *CC2-C-12070 | HCC00 |
| | 50 | KW90 | *CC2-C-12050 | HCC00 |
| | 35 | KW90 | *CC2-C-12035 | HCC00 |
| | 25 | KW90 | *CC2-C-12025 | HCC00 |
| | 16 | KW90 | CC2-C-12016 | HCC00 |
| 150 | 150 | KW200 | CC2-C-150150 | HCC00 |
| | 120 | KW150 | CC2-C-150120 | HCC00 |
| | 95 | KW150 | CC2-C-15095 | HCC00 |
| | 70 | KW90 | CC2-C-15070 | HCC00 |
| | 50 | KW90 | CC2-C-15050 | HCC00 |
| | 35 | KW90 | CC2-C-15035 | HCC00 |
| | 25 | KW90 | CC2-C-15025 | HCC00 |
| 185 | 185 | KW200 | CC2-C-185185 | HCC00 |
| | 150 | KW200 | CC2-C-185150 | HCC00 |
| | 120 | KW200 | CC2-C-185120 | HCC00 |
| | 95 | KW150 | CC2-C-18595 | HCC00 |
| | 70 | KW90 | CC2-C-18570 | HCC00 |
| | 50 | KW90 | CC2-C-18550 | HCC00 |
| | 35 | KW90 | CC2-C-18535 | HCC00 |
| | 25 | KW90 | CC2-C-18525 | HCC00 |
| 240 | 240 | KW150x2 | CC2-C-240240 | HCC00 |
| | 185 | KW200 | CC2-C-240185 | HCC00 |
| | 150 | KW200 | CC2-C-240150 | HCC00 |
| | 120 | KW200 | CC2-C-240120 | HCC00 |
| | 95 | KW150 | CC2-C-24095 | HCC00 |
| | 70 | KW90 | CC2-C-24070 | HCC00 |
| | 50 | KW90 | CC2-C-24050 | HCC00 |
| | 35 | KW90 | CC2-C-24035 | HCC00 |
| | 25 | KW90 | CC2-C-24025 | HCC00 |
| 300 | 300 | KW200x2 | CC2-D-300300 | HCD00 |
| | 240 | KW200x2 | CC2-D-300240 | HCD00 |
| | 185 | KW250 | CC2-C-300185 | HCC00 |
| | 150 | KW200 | CC2-C-300150 | HCC00 |
| | 120 | KW150 | CC2-C-300120 | HCC00 |
| | 95 | KW150 | CC2-C-30095 | HCC00 |
| | 70 | KW150 | CC2-C-30070 | HCC00 |
| | 50 | KW150 | CC2-C-30050 | HCC00 |
| | 35 | KW150 | CC2-C-30035 | HCC00 |
| | 25 | KW150 | CC2-C-30025 | HCC00 |

Note: Special requirement can be requested.

# CC4

## Cable to Cable

Horizontal to horizontal cable cross




### Equipment




### Necessary Tools




### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

- SC means Solid Copper
- "*" means to meet UL Listed
- S means Galavanized steel wire stands.

| Conductor Size | | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|---|
| A(mm²) | B(mm²) | | | |
| 10 | 10 | KW32 | *CC4-C-1010 | HCC00 |
| 16 | 16 | KW45 | *CC4-C-1616 | HCC00 |
| 25 | 25 | KW45 | *CC4-C-2525 | HCC00 |
| 35 | 35 | KW65 | *CC4-C-3535 | HCC00 |
| | 25 | KW65 | *CC4-C-3525 | HCC00 |
| Ø8 mm | Ø8 mm | KW90 | *CC4-C-8SC8SC | HCC00 |
| 50 | 50 | KW90 | *CC4-C-5050 | HCC00 |
| | 35 | KW90 | *CC4-C-5035 | HCC00 |
| | 25 | KW90 | *CC4-C-5025 | HCC00 |
| Ø10 mm | Ø10 mm | KW115 | *CC4-C-10SC10SC | HCC00 |
| 70 | 70 | KW115 | *CC4-C-7070 | HCC00 |
| | 50 | KW115 | *CC4-C-7050 | HCC00 |
| | 35 | KW115 | *CC4-C-7035 | HCC00 |
| | 25 | KW115 | *CC4-C-7025 | HCC00 |
| 95 | 95 | KW150 | *CC4-C-9595 | HCC00 |
| | 70 | KW150 | *CC4-C-9570 | HCC00 |
| | 50 | KW115 | *CC4-C-9550 | HCC00 |
| | 35 | KW115 | *CC4-C-9535 | HCC00 |
| | 25 | KW115 | *CC4-C-9525 | HCC00 |
| | 95 | KW115 | CC4-C-95S95S | HCC00 |
| 120 | 120 | KW200 | *CC4-C-120120 | HCC00 |
| | 95 | KW200 | *CC4-C-12095 | HCC00 |
| | 70 | KW150 | *CC4-C-12070 | HCC00 |
| | 50 | KW150 | *CC4-C-12050 | HCC00 |
| | 35 | KW115 | *CC4-C-12035 | HCC00 |
| | 25 | KW115 | *CC4-C-12025 | HCC00 |
| 150 | 150 | KW250 | CC4-C-150150 | HCC00 |
| | 120 | KW250 | CC4-C-150120 | HCC00 |
| | 95 | KW200 | CC4-C-15095 | HCC00 |
| | 70 | KW150 | CC4-C-15070 | HCC00 |
| | 50 | KW150 | CC4-C-15050 | HCC00 |
| | 35 | KW115 | CC4-C-15035 | HCC00 |
| | 25 | KW115 | CC4-C-15025 | HCC00 |
| 185 | 185 | KW150x2 | CC4-C-185185 | HCC00 |
| | 150 | KW250 | CC4-C-185150 | HCC00 |
| | 120 | KW250 | CC4-C-185120 | HCC00 |
| | 95 | KW200 | CC4-C-18595 | HCC00 |
| | 70 | KW200 | CC4-C-18570 | HCC00 |
| | 50 | KW200 | CC4-C-18550 | HCC00 |
| | 35 | KW150 | CC4-C-18535 | HCC00 |
| | 25 | KW150 | CC4-C-18525 | HCC00 |
| 240 | 240 | KW250x2 | CC4-D-240240 | HCD00 |
| | 185 | KW200x2 | CC4-D-240185 | HCD00 |
| | 150 | KW200x2 | CC4-D-240150 | HCD00 |
| | 120 | KW150x2 | CC4-C-240120 | HCC00 |
| | 95 | KW150x2 | CC4-C-24095 | HCC00 |
| | 70 | KW250 | CC4-C-24070 | HCC00 |
| | 50 | KW250 | CC4-C-24050 | HCC00 |
| 300 | 300 | KW200x3 | CC4-D-300300 | HCD00 |
| | 240 | KW200x3 | CC4-D-300240 | HCD00 |
| | 185 | KW250x2 | CC4-D-300185 | HCD00 |
| | 150 | KW250x2 | CC4-D-300150 | HCD00 |
| | 120 | KW200x2 | CC4-D-300120 | HCD00 |
| | 95 | KW200x2 | CC4-D-30095 | HCD00 |

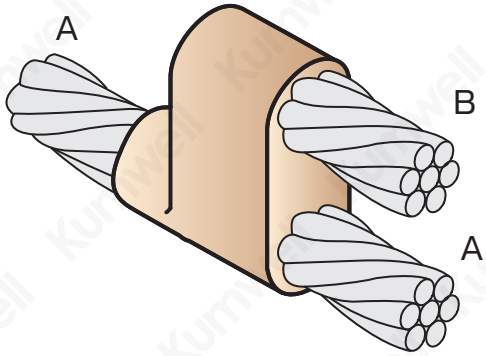
Note: Special requirement can be requested.

Kumwell

# CC6

## Cable to Cable

Horizontal parallel cable tap




| Conductor Size | | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|---|
| A(mm²) | B(mm²) | | | |
| 10 | 10 | KW45 | CC6-C-1010 | HCC00 |
| 16 | 16 | KW45 | CC6-C-1616 | HCC00 |
| 25 | 25 | KW45 | CC6-C-2525 | HCC00 |
| 35 | 35 | KW65 | CC6-C-3535 | HCC00 |
| | 25 | KW65 | CC6-C-3525 | HCC00 |
| 50 | 50 | KW90 | CC6-C-5050 | HCC00 |
| | 35 | KW65 | CC6-C-5035 | HCC00 |
| | 25 | KW65 | CC6-C-5025 | HCC00 |
| 70 | 70 | KW115 | CC6-C-7070 | HCC00 |
| | 50 | KW115 | CC6-C-7050 | HCC00 |
| | 35 | KW90 | CC6-C-7035 | HCC00 |
| | 25 | KW90 | CC6-C-7025 | HCC00 |
| 95 | 95 | KW150 | CC6-C-9595 | HCC00 |
| | 70 | KW115 | CC6-C-9570 | HCC00 |
| | 50 | KW115 | CC6-C-9550 | HCC00 |
| | 35 | KW115 | CC6-C-9535 | HCC00 |
| 120 | 120 | KW200 | CC6-C-120120 | HCC00 |
| | 95 | KW200 | CC6-C-12095 | HCC00 |
| | 70 | KW150 | CC6-C-12070 | HCC00 |
| | 50 | KW115 | CC6-C-12050 | HCC00 |
| 150 | 150 | KW250 | CC6-C-150150 | HCC00 |
| | 120 | KW250 | CC6-C-150120 | HCC00 |
| | 95 | KW200 | CC6-C-15095 | HCC00 |
| | 70 | KW150 | CC6-C-15070 | HCC00 |
| | 50 | KW150 | CC6-C-15050 | HCC00 |
| 185 | 185 | KW150x2 | CC6-D-185185 | HCD00 |
| | 150 | KW150x2 | CC6-D-185150 | HCD00 |
| | 120 | KW250 | CC6-C-185120 | HCC00 |
| | 95 | KW200 | CC6-C-18595 | HCC00 |
| | 70 | KW200 | CC6-C-18570 | HCC00 |
| 240 | 240 | KW200x2 | CC6-D-240240 | HCD00 |
| | 185 | KW150x2 | CC6-D-240185 | HCD00 |
| | 150 | KW150x2 | CC6-D-240150 | HCD00 |
| | 120 | KW250 | CC6-D-240120 | HCD00 |
| 300 | 300 | KW250x2 | CC6-D-300300 | HCD00 |
| | 240 | KW250x2 | CC6-D-300240 | HCD00 |
| | 185 | KW200x2 | CC6-D-300185 | HCD00 |
| | 150 | KW150x2 | CC6-D-300150 | HCD00 |

### Equipment




### Necessary Tools




### Recommended Tools

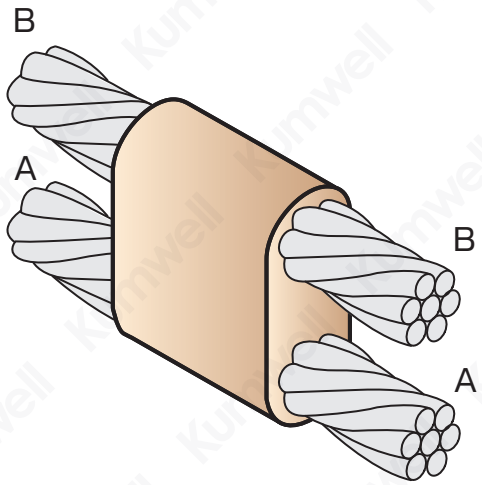
- Butane torch
- Butane gas
- Gloves

Note: Special requirement can be requested.

# CC7

## Cable to Cable

Horizontal parallel through cables




| Conductor Size | | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|---|
| A(mm²) | B(mm²) | | | |
| 10 | 10 | KW45 | CC7-C-1010 | HCC00 |
| 16 | 16 | KW45 | CC7-C-1616 | HCC00 |
| 25 | 25 | KW45 | CC7-C-2525 | HCC00 |
| 35 | 35 | KW65 | CC7-C-3535 | HCC00 |
| | 25 | KW65 | CC7-C-3525 | HCC00 |
| Ø8 mm | Ø8 mm | KW90 | CC7-C-8SC8SC | HCC00 |
| 50 | 50 | KW90 | CC7-C-5050 | HCC00 |
| | 35 | KW90 | CC7-C-5035 | HCC00 |
| | 25 | KW65 | CC7-C-5025 | HCC00 |
| Ø10 mm | Ø10 mm | KW115 | CC7-C-10SC10SC | HCC00 |
| 70 | 70 | KW115 | CC7-C-7070 | HCC00 |
| | 50 | KW115 | CC7-C-7050 | HCC00 |
| | 35 | KW90 | CC7-C-7035 | HCC00 |
| | 25 | KW90 | CC7-C-7025 | HCC00 |
| 95 | 95 | KW150 | CC7-C-9595 | HCC00 |
| | 70 | KW150 | CC7-C-9570 | HCC00 |
| | 50 | KW115 | CC7-C-9550 | HCC00 |
| | 35 | KW115 | CC7-C-9535 | HCC00 |
| 120 | 120 | KW200 | CC7-C-120120 | HCC00 |
| | 95 | KW200 | CC7-C-12095 | HCC00 |
| | 70 | KW150 | CC7-C-12070 | HCC00 |
| | 50 | KW150 | CC7-C-12050 | HCC00 |
| 150 | 150 | KW150x2 | CC7-D-150150 | HCD00 |
| | 120 | KW250 | CC7-C-150120 | HCC00 |
| | 95 | KW200 | CC7-C-15095 | HCC00 |
| | 70 | KW150 | CC7-C-15070 | HCC00 |
| 185 | 185 | KW150x2 | CC7-D-185185 | HCD00 |
| | 150 | KW150x2 | CC7-C-185150 | HCD00 |
| | 120 | KW250 | CC7-C-185120 | HCC00 |
| | 95 | KW200 | CC7-C-18595 | HCC00 |
| 240 | 240 | KW200x2 | CC7-D-240240 | HCD00 |
| | 185 | KW150x2 | CC7-D-240185 | HCD00 |
| | 150 | KW150x2 | CC7-D-240150 | HCD00 |
| | 120 | KW250 | CC7-C-240120 | HCC00 |
| 300 | 300 | KW250x2 | CC7-D-300300 | HCD00 |
| | 240 | KW250x2 | CC7-D-300240 | HCD00 |
| | 185 | KW200x2 | CC7-D-300185 | HCD00 |
| | 150 | KW150x2 | CC7-D-300150 | HCD00 |

### Equipment




### Necessary Tools




### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

- SC means Solid Copper

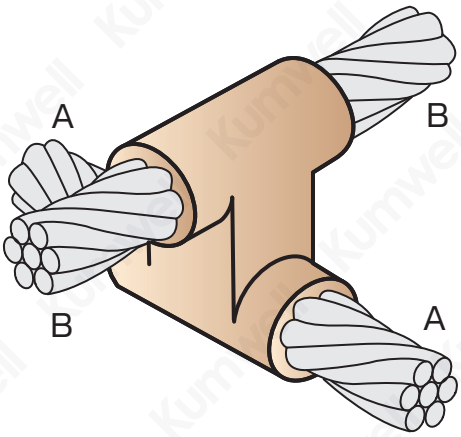
Note: Special requirement can be requested.

Kumwell

# CC11

## Cable to Cable

Horizontal to horizontal cable cross




### Equipment




### Necessary Tools




### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

- "*" means to meet UL Listed

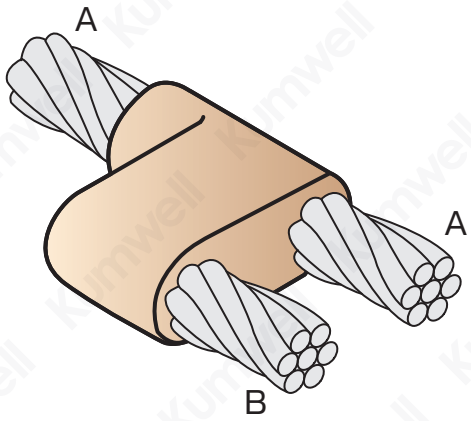
| Conductor Size A(mm²) | Conductor Size B(mm²) | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|---|
| 25 | 25 | KW65 | *CC11-M-2525 | HCC00 |
| 35 | 35 | KW90 | *CC11-M-3535 | HCC00 |
| | 25 | KW90 | CC11-M-3525 | HCC00 |
| 50 | 50 | KW150 | *CC11-M-5050 | HCC00 |
| | 35 | KW115 | CC11-M-5035 | HCC00 |
| | 25 | KW115 | CC11-M-5025 | HCC00 |
| Ø9.5 mm | Ø9.5 mm | KW200 | CC11-M-9.5SC9.5SC | HCC00 |
| 70 | 70 | KW200 | *CC11-M-7070 | HCC00 |
| | 50 | KW200 | *CC11-M-7050 | HCC00 |
| | 35 | KW150 | *CC11-M-7035 | HCC00 |
| 95 | 95 | KW250 | CC11-M-9595 | HCC00 |
| | 70 | KW250 | *CC11-M-9570 | HCC00 |
| | 50 | KW200 | *CC11-M-9550 | HCC00 |
| | 35 | KW200 | *CC11-M-9535 | HCC00 |
| 107 | 107 | KW250 | *CC11-M-107107 | HCC00 |
| 120 | 120 | KW150x2 | CC11-M-120120 | HCC00 |
| | 95 | KW150x2 | CC11-M-12095 | HCC00 |
| | 70 | KW250 | CC11-M-12070 | HCC00 |
| | 50 | KW250 | CC11-M-12050 | HCC00 |
| | 35 | KW200 | CC11-M-12035 | HCC00 |
| 150 | 150 | KW200x2 | CC11-M-150150 | HCC00 |
| | 120 | KW200x2 | CC11-M-150120 | HCC00 |
| | 95 | KW150x2 | CC11-M-15095 | HCC00 |
| | 70 | KW250 | CC11-M-15070 | HCC00 |
| | 50 | KW250 | CC11-M-15050 | HCC00 |
| | 35 | KW150 | CC11-M-15035 | HCC00 |
| 185 | 185 | KW250x2 | CC11-V-185185 | HCD00 |
| | 150 | KW250x2 | CC11-V-185150 | HCD00 |
| | 120 | KW250x2 | CC11-V-185120 | HCD00 |
| | 95 | KW200x2 | CC11-V-18595 | HCD00 |
| | 70 | KW150x2 | CC11-M-18570 | HCC00 |
| | 50 | KW250 | CC11-M-18550 | HCC00 |
| | 35 | KW200 | CC11-M-18535 | HCC00 |
| 240 | 240 | KW200x3 | CC11-V-240240 | HCD00 |
| | 185 | KW200x3 | CC11-V-240185 | HCD00 |
| | 150 | KW200x3 | CC11-V-240150 | HCD00 |
| | 120 | KW200x3 | CC11-V-240120 | HCD00 |
| | 95 | KW250x2 | CC11-V-24095 | HCD00 |
| | 70 | KW250x2 | CC11-V-24070 | HCD00 |
| | 50 | KW200x2 | CC11-V-24050 | HCD00 |
| 300 | 300 | KW250x3 | CC11-V-300300 | HCD00 |
| | 240 | KW250x3 | CC11-V-300240 | HCD00 |
| | 185 | KW200x3 | CC11-V-300185 | HCD00 |
| | 150 | KW200x3 | CC11-V-300150 | HCD00 |
| | 120 | KW250x2 | CC11-V-300120 | HCD00 |
| | 95 | KW250x2 | CC11-V-30095 | HCD00 |

Note: Special requirement can be requested.

# CC13

## Cable to Cable

Horizontal parallel cable tap (side by side)




| Conductor Size | | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|---|
| A(mm²) | B(mm²) | | | |
| 10 | 10 | KW45 | CC13-C-1010 | HCC00 |
| 16 | 16 | KW45 | CC13-C-1616 | HCC00 |
| 25 | 25 | KW45 | CC13-C-2525 | HCC00 |
| 35 | 35 | KW65 | CC13-C-3535 | HCC00 |
| | 25 | KW65 | CC13-C-3525 | HCC00 |
| 50 | 50 | KW90 | CC13-C-5050 | HCC00 |
| | 35 | KW65 | CC13-C-5035 | HCC00 |
| | 25 | KW65 | CC13-C-5025 | HCC00 |
| 70 | 70 | KW115 | CC13-C-7070 | HCC00 |
| | 50 | KW115 | CC13-C-7050 | HCC00 |
| | 35 | KW90 | CC13-C-7035 | HCC00 |
| | 25 | KW90 | CC13-C-7025 | HCC00 |
| 95 | 95 | KW150 | CC13-C-9595 | HCC00 |
| | 70 | KW115 | CC13-C-9570 | HCC00 |
| | 50 | KW115 | CC13-C-9550 | HCC00 |
| | 35 | KW115 | CC13-C-9535 | HCC00 |
| 120 | 120 | KW200 | CC13-C-120120 | HCC00 |
| | 95 | KW200 | CC13-C-12095 | HCC00 |
| | 70 | KW150 | CC13-C-12070 | HCC00 |
| | 50 | KW115 | CC13-C-12050 | HCC00 |
| 150 | 150 | KW250 | CC13-C-150150 | HCC00 |
| | 120 | KW250 | CC13-C-150120 | HCC00 |
| | 95 | KW200 | CC13-C-15095 | HCC00 |
| | 70 | KW150 | CC13-C-15070 | HCC00 |
| | 50 | KW115 | CC13-C-15050 | HCC00 |
| 185 | 185 | KW150x2 | CC13-D-185185 | HCD00 |
| | 150 | KW150x2 | CC13-D-185150 | HCD00 |
| | 120 | KW250 | CC13-C-185120 | HCC00 |
| | 95 | KW200 | CC13-C-18595 | HCC00 |
| | 70 | KW200 | CC13-C-18570 | HCC00 |
| 240 | 240 | KW200x2 | CC13-D-240240 | HCD00 |
| | 185 | KW150x2 | CC13-D-240185 | HCD00 |
| | 150 | KW150x2 | CC13-D-240150 | HCD00 |
| | 120 | KW250 | CC13-C-240120 | HCC00 |
| 300 | 300 | KW250x2 | CC13-D-300300 | HCD00 |
| | 240 | KW250x2 | CC13-D-300240 | HCD00 |
| | 185 | KW200x2 | CC13-D-300185 | HCD00 |
| | 150 | KW150x2 | CC13-D-300150 | HCD00 |

### Equipment




### Necessary Tools




### Recommended Tools

- Butane torch
- Butane gas
- Gloves

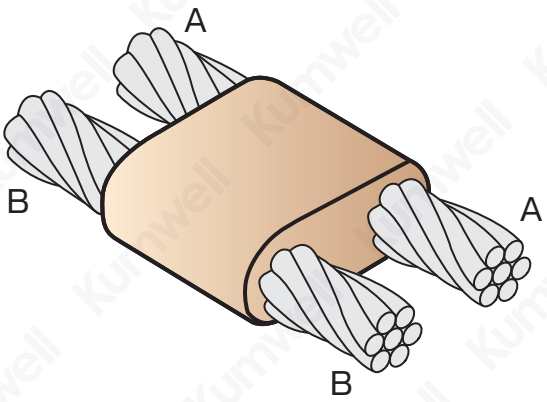
Note: Special requirement can be requested.

Kumwell

# CC14

## Cable to Cable

Horizontal parallel through cables tap (side by side)




| Conductor Size | | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|---|
| A(mm²) | B(mm²) | | | |
| 10 | 10 | KW45 | CC14-C-1010 | HCC00 |
| 16 | 16 | KW45 | CC14-C-1616 | HCC00 |
| 25 | 25 | KW45 | CC14-C-2525 | HCC00 |
| 35 | 35 | KW65 | CC14-C-3535 | HCC00 |
| | 25 | KW65 | CC14-C-3525 | HCC00 |
| Ø8 mm | Ø8 mm | KW90 | CC14-C-8SC8SC | HCC00 |
| 50 | 50 | KW90 | CC14-C-5050 | HCC00 |
| | 35 | KW65 | CC14-C-5035 | HCC00 |
| | 25 | KW65 | CC14-C-5025 | HCC00 |
| Ø10 mm | Ø10 mm | KW115 | CC14-C-10SC10SC | HCC00 |
| 70 | 70 | KW115 | CC14-C-7070 | HCC00 |
| | 50 | KW115 | CC14-C-7050 | HCC00 |
| | 35 | KW90 | CC14-C-7035 | HCC00 |
| | 25 | KW90 | CC14-C-7025 | HCC00 |
| 95 | 95 | KW150 | CC14-C-9595 | HCC00 |
| | 70 | KW150 | CC14-C-9570 | HCC00 |
| | 50 | KW115 | CC14-C-9550 | HCC00 |
| | 35 | KW115 | CC14-C-9535 | HCC00 |
| 120 | 120 | KW200 | CC14-C-120120 | HCC00 |
| | 95 | KW200 | CC14-C-12095 | HCC00 |
| | 70 | KW150 | CC14-C-12070 | HCC00 |
| | 50 | KW150 | CC14-C-12050 | HCC00 |
| 150 | 150 | KW250 | CC14-C-150150 | HCC00 |
| | 120 | KW250 | CC14-C-150120 | HCC00 |
| | 95 | KW200 | CC14-C-15095 | HCC00 |
| | 70 | KW150 | CC14-C-15070 | HCC00 |
| 185 | 185 | KW150x2 | CC14-D-185185 | HCD00 |
| | 150 | KW150x2 | CC14-D-185150 | HCD00 |
| | 120 | KW250 | CC14-C-185120 | HCC00 |
| | 95 | KW200 | CC14-C-18595 | HCC00 |
| 240 | 240 | KW200x2 | CC14-D-240240 | HCD00 |
| | 185 | KW150x2 | CC14-D-240185 | HCD00 |
| | 150 | KW150x2 | CC14-D-240150 | HCD00 |
| | 120 | KW250 | CC14-C-240120 | HCC00 |
| 300 | 300 | KW250x2 | CC14-D-300300 | HCD00 |
| | 240 | KW250x2 | CC14-D-300240 | HCD00 |
| | 185 | KW200x2 | CC14-D-300185 | HCD00 |
| | 150 | KW150x2 | CC14-D-300150 | HCD00 |

### Equipment




### Necessary Tools




### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

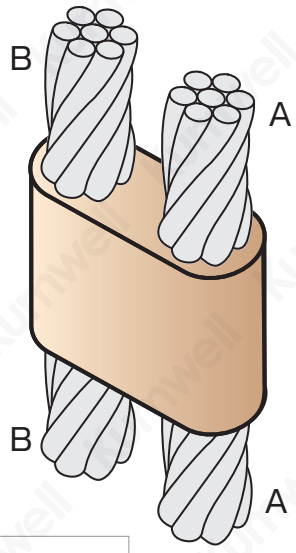
- SC means Solid Copper

Note: Special requirement can be requested.

# CC34

## Cable to Cable

Vertical parallel through cables (side by side)




| Conductor Size | | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|---|
| A(mm²) | B(mm²) | | | |
| 25 | 25 | KW65 | CC34-CR-2525 | HCC00 |
| 35 | 35 | KW115 | CC34-CR-3535 | HCC00 |
| | 25 | KW90 | CC34-CR-3525 | HCC00 |
| Ø8 mm | Ø8 mm | KW115 | CC34-CR-8SC8SC | HCC00 |
| 50 | 50 | KW150 | CC34-CR-5050 | HCC00 |
| | 35 | KW115 | CC34-CR-5035 | HCC00 |
| | 25 | KW115 | CC34-CR-5025 | HCC00 |
| Ø10 mm | Ø10 mm | KW150 | CC34-CR-10SC10SC | HCC00 |
| 70 | 70 | KW150 | CC34-CR-7070 | HCC00 |
| | 50 | KW150 | CC34-CR-7050 | HCC00 |
| | 35 | KW150 | CC34-CR-7035 | HCC00 |
| | 25 | KW115 | CC34-CR-7025 | HCC00 |
| 95 | 95 | KW250 | CC34-CR-9595 | HCC00 |
| | 70 | KW250 | CC34-CR-9570 | HCC00 |
| | 50 | KW200 | CC34-CR-9550 | HCC00 |
| | 35 | KW200 | CC34-CR-9535 | HCC00 |
| | 25 | KW150 | CC34-CR-7025 | HCC00 |
| 120 | 120 | KW200x2 | CC34-DR-120120 | HCD00 |
| | 95 | KW250 | CC34-CR-12095 | HCC00 |
| | 70 | KW250 | CC34-CR-12070 | HCC00 |
| | 50 | KW250 | CC34-CR-12050 | HCC00 |
| | 35 | KW200 | CC34-CR-12035 | HCC00 |
| | 25 | KW200 | CC34-CR-12025 | HCC00 |
| 150 | 150 | KW200x2 | CC34-DR-150150 | HCD00 |
| | 120 | KW200x2 | CC34-DR-150120 | HCD00 |
| | 95 | KW150x2 | CC34-DR-15095 | HCD00 |
| 185 | 185 | KW250x2 | CC34-DR-185185 | HCD00 |
| | 150 | KW250x2 | CC34-DR-185150 | HCD00 |
| | 120 | KW200x2 | CC34-DR-185120 | HCD00 |
| | 95 | KW150x2 | CC34-DR-18595 | HCD00 |
| 240 | 240 | KW250x3 | CC34-DR-240240 | HCD00 |
| | 185 | KW250x3 | CC34-DR-240185 | HCD00 |
| | 150 | KW250x3 | CC34-DR-240150 | HCD00 |
| | 120 | KW250x3 | CC34-DR-240120 | HCD00 |
| 300 | 300 | KW250x3 | CC34-DR-300300 | HCD00 |
| | 240 | KW250x3 | CC34-DR-300240 | HCD00 |
| | 185 | KW250x3 | CC34-DR-300185 | HCD00 |
| | 150 | KW250x3 | CC34-DR-300150 | HCD00 |

### Equipment




### Necessary Tools




### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

- SC means Solid Copper

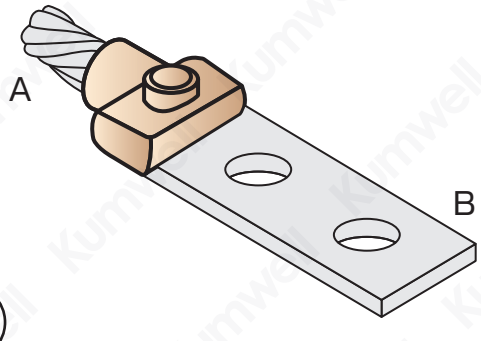
Note: Special requirement can be requested.

Kumwell

# CB1 (Lug)

## Cable to Busbar

Horizontal cable tap to copper lug




| Conductor Size | | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|---|
| A(mm²) | B(mmxmm) | | | |
| 10 | 25x3 | KW32 | *CB1-C-10253L | HCC00 |
| 16 | 25x3 | KW32 | *CB1-C-16253L | HCC00 |
| | 25x5 | KW32 | CB-C-16255L | HCC00 |
| 25 | 25x3 | KW32 | *CB1-C-25253L | HCC00 |
| | 25x5 | KW32 | CB1-C-25255L | HCC00 |
| | 25x6 | KW32 | CB1-C-25256L | HCC00 |
| | 25x6 | KW65 | CB1-C-25386L | HCC00 |
| 35 | 25x3 | KW32 | *CB1-C-35253L | HCC00 |
| | 25x5 | KW32 | CB1-C-35255L | HCC00 |
| | 25x6 | KW32 | CB1-C-35256L | HCC00 |
| | 25x6 | KW65 | CB1-C-35386L | HCC00 |
| 50 | 25x3 | KW45 | *CB1-C-50253L | HCC00 |
| | 25x5 | KW45 | CB1-C-50255L | HCC00 |
| | 25x6 | KW45 | CB1-C-50256L | HCC00 |
| | 38x6 | KW65 | CB1-C-50386L | HCC00 |
| 70 | 25x3 | KW45 | *CB1-C-70253L | HCC00 |
| | 25x5 | KW65 | CB1-C-70255L | HCC00 |
| | 25x6 | KW65 | CB1-C-70256L | HCC00 |
| | 38x6 | KW115 | CB1-C-70386L | HCC00 |
| 95 | 25x3 | KW65 | *CB1-C-95253L | HCC00 |
| | 25x5 | KW65 | *CB1-C-95255L | HCC00 |
| | 25x6 | KW65 | CB1-C-95256L | HCC00 |
| | 38x6 | KW115 | CB1-C-95386L | HCC00 |
| 120 | 25x5 | KW65 | *CB1-C-120255L | HCC00 |
| | 25x6 | KW65 | CB1-C-120256L | HCC00 |
| | 38x6 | KW115 | CB1-C-120386L | HCC00 |
| 150 | 25x6 | KW90 | *CB1-C-150256L | HCC00 |
| | 38x6 | KW115 | CB1-C-150386L | HCC00 |
| 185 | 25x6 | KW90 | *CB1-C-185256L | HCC00 |
| | 38x6 | KW115 | CB1-C-185386L | HCC00 |
| 240 | 40x6 | KW150 | *CB1-C-240406L | HCC00 |

### Equipment




### Necessary Tools

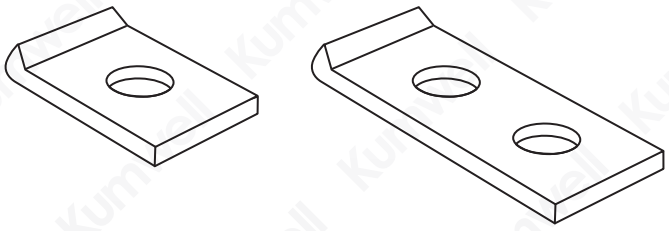



### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

- This connection is used for cable conductor to 1 or 2-hole copper lug
- "*" means to meet UL Listed



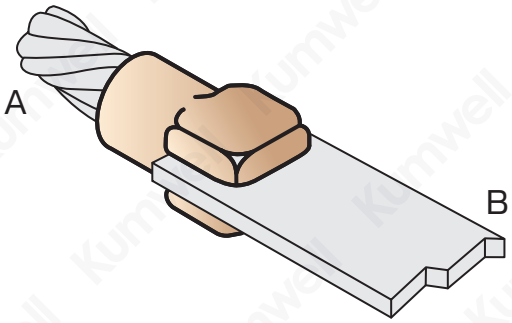
Kumwell L-Lug Series

Note: Special requirement can be requested.

# CB1

## Cable to Busbar

Horizontal cable tap to horizontal lug or busbar




| Conductor Size | | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|---|
| A(mm²) | B(mmxmm) | | | |
| 10 | 20x2 | KW32 | CB1-C-10202 | HCC00 |
| 16 | 20x2 | KW32 | CB1-C-16202 | HCC00 |
| | 20x3 | KW32 | CB1-C-16203 | HCC00 |
| | 20x3 | KW45 | CB1-C-16253 | HCC00 |
| 25 | 20x2 | KW32 | CB1-C-25202 | HCC00 |
| | 20x3 | KW45 | CB1-C-25203 | HCC00 |
| | 20x3 | KW45 | CB1-C-25253 | HCC00 |
| 35 | 20x2 | KW32 | CB1-C-35202 | HCC00 |
| | 20x3 | KW45 | CB1-C-35203 | HCC00 |
| | 20x3 | KW45 | CB1-C-35253 | HCC00 |
| Ø8 mm | 20x3 | KW45 | CB1-C-8SC203 | HCC00 |
| | 25x3 | KW65 | CB1-C-8SC253 | HCC00 |
| 50 | 20x2 | KW45 | CB1-C-50202 | HCC00 |
| | 20x3 | KW45 | CB1-C-50203 | HCC00 |
| | 20x3 | KW65 | CB1-C-50253 | HCC00 |
| Ø10 mm | 25x3 | KW65 | CB1-C-10SC253 | HCC00 |
| | 25x4 | KW65 | CB1-C-10SC254 | HCC00 |
| | 25x6 | KW65 | CB1-C-10SC256 | HCC00 |
| 70 | 25x3 | KW65 | CB1-C-70253 | HCC00 |
| | 25x4 | KW90 | CB1-C-70254 | HCC00 |
| | 25x6 | KW90 | CB1-C-70256 | HCC00 |
| 95 | 25x3 | KW90 | CB1-C-95253 | HCC00 |
| | 25x4 | KW90 | CB1-C-95254 | HCC00 |
| | 25x5 | KW90 | CB1-C-95255 | HCC00 |
| | 25x6 | KW90 | CB1-C-95256 | HCC00 |
| 120 | 25x3 | KW90 | CB1-C-120253 | HCC00 |
| | 25x4 | KW90 | CB1-C-120254 | HCC00 |
| | 25x5 | KW115 | CB1-C-120255 | HCC00 |
| | 25x6 | KW115 | CB1-C-120256 | HCC00 |
| | 30x5 | KW115 | CB1-C-120305 | HCC00 |
| | 50x3 | KW115 | CB1-C-120503 | HCC00 |
| | 50x6 | KW150 | CB1-C-120506 | HCC00 |
| 150 | 25x6 | KW115 | CB1-C-150256 | HCC00 |
| | 30x5 | KW115 | CB1-C-150305 | HCC00 |
| | 40x5 | KW150 | CB1-C-150405 | HCC00 |
| | 50x3 | KW115 | CB1-C-150503 | HCC00 |
| | 50x4 | KW115 | CB1-C-150504 | HCC00 |
| | 50x6 | KW150 | CB1-C-150506 | HCC00 |
| 185 | 30x5 | KW150 | CB1-C-185305 | HCC00 |
| | 31x6 | KW150 | CB1-C-185316 | HCC00 |
| | 38x6 | KW150 | CB1-C-185386 | HCC00 |
| | 40x5 | KW150 | CB1-C-185405 | HCC00 |
| | 50x4 | KW150 | CB1-D-185504 | HCD00 |
| | 50x5 | KW200 | CB1-D-185505 | HCD00 |
| | 50x6 | KW200 | CB1-D-185506 | HCD00 |
| 240 | 50x3 | KW200 | CB1-D-240503 | HCD00 |
| | 50x4 | KW200 | CB1-D-240504 | HCD00 |
| | 50x5 | KW200 | CB1-D-240505 | HCD00 |
| | 50x6 | KW150x2 | CB1-D-240506 | HCD00 |
| 300 | 50x6 | KW150x2 | CB1-D-300506 | HCD00 |
| | 50x8 | KW200x2 | CB1-D-300508 | HCD00 |

### Equipment




### Necessary Tools




### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

- This connection is used for cable conductor to copper strip or tape
- "*" means to meet UL Listed

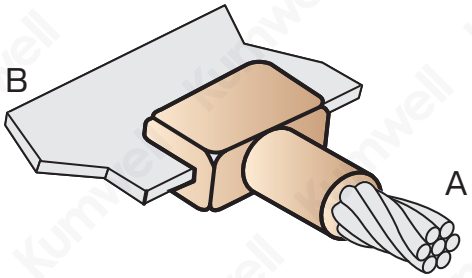
Note: Special requirement can be requested.

Kumwell

# CB4

## Cable to Busbar

Horizontal cable tap to horizontal busbar




| Conductor Size | | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|---|
| A(mm²) | B(mmxmm) | | | |
| 10 | 20x2 | KW25 | *CB4-C-10202 | HCC00 |
| 16 | 20x2 | KW32 | *CB4-C-16202 | HCC00 |
| | 20x3 | KW32 | *CB4-C-16203 | HCC00 |
| | 25x3 | KW32 | *CB4-C-16253 | HCC00 |
| 25 | 20x2 | KW25 | *CB4-C-25202 | HCC00 |
| | 20x3 | KW32 | *CB4-C-25203 | HCC00 |
| | 25x3 | KW32 | *CB4-C-25253 | HCC00 |
| 35 | 20x2 | KW32 | *CB4-C-35202 | HCC00 |
| | 20x3 | KW45 | *CB4-C-35203 | HCC00 |
| | 25x3 | KW45 | *CB4-C-35253 | HCC00 |
| | 25x6 | KW65 | *CB4-C-35256 | HCC00 |
| Ø8 mm | 25x2 | KW45 | CB4-C-8SC252 | HCC00 |
| | 25x3 | KW45 | CB4-C-8SC253 | HCC00 |
| 50 | 20x3 | KW45 | *CB4-C-50203 | HCC00 |
| | 25x2 | KW45 | *CB4-C-50252 | HCC00 |
| | 25x3 | KW45 | *CB4-C-50253 | HCC00 |
| | 25x4 | KW65 | *CB4-C-50254 | HCC00 |
| | 25x6 | KW65 | *CB4-C-50256 | HCC00 |
| Ø10 mm | 25x3 | KW65 | *CB4-C-10SC253 | HCC00 |
| | 25x4 | KW65 | *CB4-C-10SC254 | HCC00 |
| 70 | 25x3 | KW65 | *CB4-C-70253 | HCC00 |
| | 25x4 | KW65 | *CB4-C-70254 | HCC00 |
| | 25x6 | KW90 | *CB4-C-70256 | HCC00 |
| 95 | 25x3 | KW90 | *CB4-C-95253 | HCC00 |
| | 25x4 | KW90 | *CB4-C-95254 | HCC00 |
| | 25x5 | KW90 | *CB4-C-95255 | HCC00 |
| | 25x6 | KW115 | *CB4-C-95256 | HCC00 |
| 120 | 25x3 | KW90 | *CB4-C-120253 | HCC00 |
| | 25x5 | KW90 | *CB4-C-120255 | HCC00 |
| | 25x6 | KW115 | *CB4-C-120256 | HCC00 |
| | 30x5 | KW115 | *CB4-C-120305 | HCC00 |
| 150 | 25x6 | KW115 | *CB4-C-150256 | HCC00 |
| | 30x5 | KW115 | *CB4-C-150305 | HCC00 |
| | 40x5 | KW150 | *CB4-C-150405 | HCC00 |
| 185 | 25x3 | KW150 | *CB4-C-185253 | HCC00 |
| | 30x5 | KW150 | CB4-C-185305 | HCC00 |
| | 40x5 | KW150 | CB4-C-185405 | HCC00 |
| | 50x5 | KW150 | *CB4-C-185505 | HCC00 |
| | 50x6 | KW150 | *CB4-C-185506 | HCC00 |
| 240 | 50x5 | KW200 | CB4-C-240505 | HCC00 |
| | 50x6 | KW250 | CB4-C-240506 | HCC00 |
| 300 | 50x6 | KW150x2 | *CB4-D-300506 | HCD00 |
| | 50x8 | KW200x2 | *CB4-D-300508 | HCD00 |

### Equipment




### Necessary Tools




### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

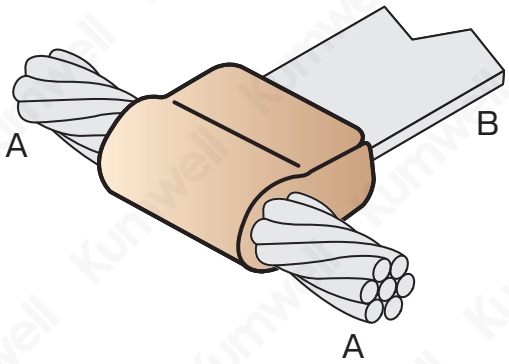
- SC means Solid Copper

Note: Special requirement can be requested.

# CB5

## Cable to Busbar

Horizontal busbar tap to horizontal cable run




| Conductor Size | | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|---|
| A(mm²) | B(mmxmm) | | | |
| 10 | 20x2 | KW45 | CB5-C-10202 | HCC00 |
| 16 | 20x2 | KW45 | CB5-C-16202 | HCC00 |
| | 20x3 | KW45 | CB5-C-16203 | HCC00 |
| | 25x3 | KW65 | CB5-C-16253 | HCC00 |
| 25 | 20x2 | KW45 | CB5-C-25202 | HCC00 |
| | 20x3 | KW45 | CB5-C-25203 | HCC00 |
| | 25x3 | KW65 | CB5-C-25253 | HCC00 |
| 35 | 20x2 | KW45 | CB5-C-35202 | HCC00 |
| | 20x3 | KW45 | CB5-C-35203 | HCC00 |
| | 25x3 | KW65 | CB5-C-35253 | HCC00 |
| Ø8 mm | 25x2 | KW65 | CB5-C-8SC252 | HCC00 |
| | 25x2 | KW65 | CB5-C-8SC253 | HCC00 |
| 50 | 20x3 | KW65 | CB5-C-50203 | HCC00 |
| | 25x2 | KW65 | CB5-C-50252 | HCC00 |
| | 25x3 | KW65 | CB5-C-50253 | HCC00 |
| Ø10 mm | 25x3 | KW115 | CB5-C-10SC253 | HCC00 |
| | 25x4 | KW150 | CB5-C-10SC254 | HCC00 |
| 70 | 25x3 | KW90 | CB5-C-70253 | HCC00 |
| | 25x4 | KW115 | CB5-C-70254 | HCC00 |
| | 25x6 | KW115 | CB5-C-70256 | HCC00 |
| 95 | 25x4 | KW150 | CB5-C-95254 | HCC00 |
| | 25x5 | KW150 | CB5-C-95255 | HCC00 |
| | 25x6 | KW150 | CB5-C-95256 | HCC00 |
| 120 | 25x5 | KW150 | CB5-C-120255 | HCC00 |
| | 25x6 | KW150 | CB5-C-120256 | HCC00 |
| | 30x5 | KW200 | CB5-C-120305 | HCC00 |
| 150 | 25x6 | KW200 | CB5-C-150256 | HCC00 |
| | 30x5 | KW200 | CB5-C-150305 | HCC00 |
| | 40x5 | KW250 | CB5-C-150405 | HCC00 |
| 185 | 30x5 | KW250 | CB5-C-185305 | HCC00 |
| | 40x5 | KW250 | CB5-C-185405 | HCC00 |
| | 50x5 | KW150x2 | CB5-D-185505 | HCD00 |
| 240 | 30x5 | KW250 | CB5-C-240305 | HCC00 |
| | 40x5 | KW250 | CB5-C-240405 | HCC00 |
| | 50x5 | KW150x2 | CB5-D-240505 | HCD00 |
| | 50x6 | KW200x2 | CB5-D-240506 | HCD00 |
| 300 | 50x6 | KW250x2 | CB5-D-300506 | HCD00 |
| | 50x8 | KW250x2 | CB5-D-300508 | HCD00 |

### Equipment




### Necessary Tools




### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

- SC means Solid Copper

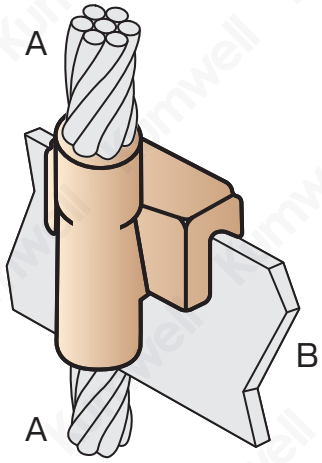
Note: Special requirement can be requested.

Kumwell

# CB29

## Cable to Busbar

Vertical cable through horizontal busbar on edge




### Equipment




### Necessary Tools




### Recommended Tools

- Butane torch
- Butane gas
- Gloves

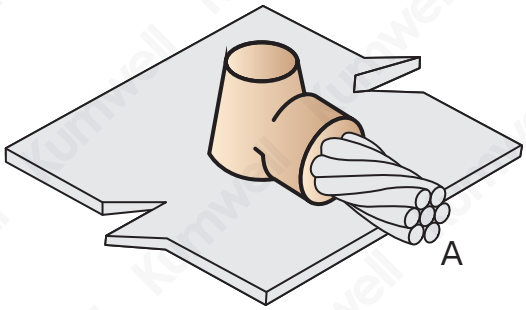
| Conductor Size | | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|---|
| A(mm²) | B(mmxmm) | | | |
| 35 | 40x5 | KW200 | CB29-E-35405 | HCC00 |
| | 40x6 | KW250 | CB29-E-35406 | HCC00 |
| | 50x6 | KW250 | CB29-E-35506 | HCC00 |
| | 50x8 | KW250 | CB29-E-35508 | HCC00 |
| | 50x12 | KW150x2 | CB29-J-355012 | HCD00 |
| 50 | 40x5 | KW150x2 | CB29-J-50405 | HCD00 |
| | 40x6 | KW200x2 | CB29-J-50406 | HCD00 |
| | 50x6 | KW200x2 | CB29-J-50506 | HCD00 |
| | 50x8 | KW200x2 | CB29-J-50508 | HCD00 |
| | 50x12 | KW250x2 | CB29-J-505012 | HCD00 |
| 70 | 40x5 | KW150x2 | CB29-J-70405 | HCD00 |
| | 40x6 | KW200x2 | CB29-J-70406 | HCD00 |
| | 50x6 | KW200x2 | CB29-J-70506 | HCD00 |
| | 50x8 | KW200x2 | CB29-J-70508 | HCD00 |
| | 50x12 | KW250x2 | CB29-J-705012 | HCD00 |
| 95 | 40x5 | KW200x2 | CB29-J-95405 | HCD00 |
| | 40x6 | KW250x2 | CB29-J-95406 | HCD00 |
| | 50x6 | KW250x2 | CB29-J-95506 | HCD00 |
| | 50x8 | KW250x2 | CB29-J-95508 | HCD00 |
| | 50x12 | KW200x3 | CB29-J-955012 | HCD00 |
| 120 | 40x5 | KW200x2 | CB29-J-120405 | HCD00 |
| | 40x6 | KW250x2 | CB29-J-120406 | HCD00 |
| | 50x6 | KW250x2 | CB29-J-120506 | HCD00 |
| | 50x8 | KW250x2 | CB29-J-120508 | HCD00 |
| | 50x12 | KW200x3 | CB29-J-1205012 | HCD00 |
| 150 | 40x5 | KW200x2 | CB29-J-150405 | HCD00 |
| | 40x6 | KW250x2 | CB29-J-150406 | HCD00 |
| | 50x6 | KW250x2 | CB29-J-150506 | HCD00 |
| | 50x8 | KW250x2 | CB29-J-150508 | HCD00 |
| | 50x12 | KW200x3 | CB29-J-1505012 | HCD00 |
| 185 | 40x5 | KW200x2 | CB29-J-185405 | HCD00 |
| | 40x6 | KW250x2 | CB29-J-185406 | HCD00 |
| | 50x6 | KW250x2 | CB29-J-185506 | HCD00 |
| | 50x8 | KW250x2 | CB29-J-185508 | HCD00 |
| | 50x12 | KW200x3 | CB29-J-1855012 | HCD00 |
| 240 | 40x5 | KW200x2 | CB29-J-240405 | HCD00 |
| | 40x6 | KW250x2 | CB29-J-240406 | HCD00 |
| | 50x6 | KW250x2 | CB29-J-240506 | HCD00 |
| | 50x8 | KW250x2 | CB29-J-240508 | HCD00 |
| | 50x12 | KW200x3 | CB29-J-2405012 | HCD00 |
| 300 | 40x5 | KW250x2 | CB29-J-300405 | HCD00 |
| | 40x6 | KW200x3 | CB29-J-300406 | HCD00 |
| | 50x6 | KW200x3 | CB29-J-300506 | HCD00 |
| | 50x8 | KW200x3 | CB29-J-300508 | HCD00 |
| | 50x12 | KW250x3 | CB29-J-3005012 | HCD00 |

Note: Special requirement can be requested.

# CB34

## Cable to Busbar

Horizontal cable to signal reference ground grid




| Conductor Size A(mm²) | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|
| 16 | KW25 | CB34-C-16 | HCC00 |
| 25 | KW32 | CB34-C-25 | HCC00 |
| 35 | KW32 | CB34-C-35 | HCC00 |

### Equipment


Mold


Metal powder


Handle clamp


Steel disk

### Necessary Tools


Mold brush


Cable clean brush


Busbar brush


Flint igniter


Scraper



Tool box

### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

- This connection is recommend for copper cable to signal reference ground grid (0.5 mm thick copper strip) connection
- Before making connection, it need to preheat copper strip and conductor

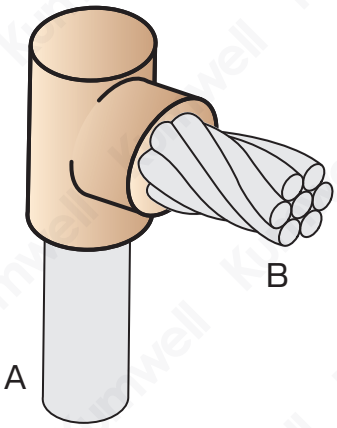
Note: Special requirement can be requested.

Kumwell

# CR1

## Cable to Ground Rod

Horizontal cable terminal to ground rod




| Rod Size | | Conductor Size | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|---|---|
| A(mm.) | A(inch) | B(mm²) | | | |
| 12.7 | 1/2 | 10 | KW65 | *CR1-C-12710 | HCC00 |
| | | 16 | KW65 | *CR1-C-12716 | HCC00 |
| | | Ø5.6 mm | KW65 | *CR1-C-1275.6SC | HCC00 |
| | | 25 | KW65 | *CR1-C-12725 | HCC00 |
| | | 35 | KW65 | *CR1-C-12735 | HCC00 |
| | | Ø8 mm | KW65 | *CR1-C-1278SC | HCC00 |
| | | 50 | KW65 | *CR1-C-12750 | HCC00 |
| | | Ø10 mm | KW65 | *CR1-C-12710SC | HCC00 |
| | | 70 | KW90 | *CR1-C-12770 | HCC00 |
| | | 95 | KW90 | *CR1-C-12795 | HCC00 |
| | | 120 | KW90 | *CR1-C-127120 | HCC00 |
| | | 150 | KW115 | CR1-C-127150 | HCC00 |
| | | 185 | KW115 | CR1-C-127185 | HCC00 |
| 14.2 | 5/8 | 10 | KW65 | *CR1-C-14210 | HCC00 |
| | | 16 | KW65 | *CR1-C-14216 | HCC00 |
| | | Ø5.6 mm | KW65 | *CR1-C-1425.6SC | HCC00 |
| | | 25 | KW65 | *CR1-C-14225 | HCC00 |
| | | 35 | KW90 | *CR1-C-14235 | HCC00 |
| | | Ø8 mm | KW90 | *CR1-C-1428SC | HCC00 |
| | | 50 | KW90 | *CR1-C-14250 | HCC00 |
| | | 70 | KW90 | *CR1-C-14270 | HCC00 |
| | | 95 | KW90 | *CR1-C-14295 | HCC00 |
| | | 120 | KW90 | *CR1-C-142120 | HCC00 |
| | | 150 | KW115 | CR1-C-142150 | HCC00 |
| | | 185 | KW150 | CR1-C-142185 | HCC00 |
| | | 240 | KW150 | CR1-C-142240 | HCC00 |
| 17.2 | 3/4 | 10 | KW65 | *CR1-C-17210 | HCC00 |
| | | 16 | KW65 | *CR1-C-17216 | HCC00 |
| | | 25 | KW65 | *CR1-C-17225 | HCC00 |
| | | 35 | KW65 | *CR1-C-17235 | HCC00 |
| | | Ø8 mm | KW90 | *CR1-C-1728SC | HCC00 |
| | | 50 | KW90 | *CR1-C-17250 | HCC00 |
| | | 70 | KW90 | *CR1-C-17270 | HCC00 |
| | | 95 | KW90 | *CR1-C-17295 | HCC00 |
| | | 120 | KW90 | *CR1-C-172120 | HCC00 |
| | | 150 | KW115 | CR1-C-172150 | HCC00 |
| | | 185 | KW150 | CR1-C-172185 | HCC00 |
| | | 240 | KW150 | CR1-C-172240 | HCC00 |
| | | 300 | KW200 | CR1-C-172300 | HCC00 |
| 23.1 | 1 | 16 | KW150 | CR1-C-23116 | HCC00 |
| | | 25 | KW150 | CR1-C-23125 | HCC00 |
| | | 35 | KW150 | CR1-C-23135 | HCC00 |
| | | 50 | KW150 | CR1-C-23150 | HCC00 |
| | | 70 | KW150 | CR1-C-23170 | HCC00 |
| | | 95 | KW150 | CR1-C-23195 | HCC00 |
| | | 120 | KW200 | CR1-C-231120 | HCC00 |
| | | 150 | KW200 | CR1-C-231150 | HCC00 |
| | | 185 | KW200 | CR1-C-231185 | HCC00 |
| | | 240 | KW250 | CR1-C-231240 | HCD00 |

### Equipment




### Necessary Tools




### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

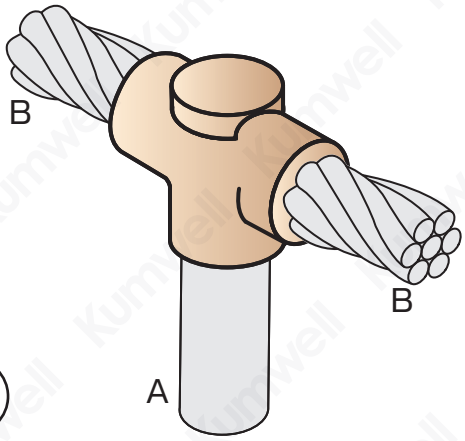
- SC means solid copper
- For special rod size's requirement, please contact us
- "*" means to meet UL Listed

Note: Special requirement can be requested.

# CR2

## Cable to Ground Rod

Horizontal through cable to ground rod




| Rod Size | | Conductor Size | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|---|---|
| A(mm.) | A(inch) | B(mm²) | | | |
| 12.7 | 1/2 | 10 | KW90 | *CR2-C-12710 | HCC00 |
| | | 16 | KW90 | *CR2-C-12716 | HCC00 |
| | | Ø5.6 mm | KW90 | *CR2-C-1275.6SC | HCC00 |
| | | 25 | KW90 | *CR2-C-12725 | HCC00 |
| | | 35 | KW90 | *CR2-C-12735 | HCC00 |
| | | Ø8 mm | KW90 | *CR2-C-1278SC | HCC00 |
| | | 50 | KW90 | *CR2-C-12750 | HCC00 |
| | | Ø10 mm | KW90 | *CR2-C-12710SC | HCC00 |
| | | 70 | KW90 | *CR2-C-12770 | HCC00 |
| | | 95 | KW115 | *CR2-C-12795 | HCC00 |
| | | 120 | KW150 | *CR2-C-127120 | HCC00 |
| | | 150 | KW200 | CR2-C-127150 | HCC00 |
| | | 185 | KW200 | CR2-C-127185 | HCC00 |
| 14.2 | 5/8 | 10 | KW65 | *CR2-C-14210 | HCC00 |
| | | 16 | KW65 | *CR2-C-14216 | HCC00 |
| | | Ø5.6 mm | KW90 | *CR2-C-1425.6SC | HCC00 |
| | | 25 | KW90 | *CR2-C-14225 | HCC00 |
| | | 35 | KW90 | *CR2-C-14235 | HCC00 |
| | | Ø8 mm | KW90 | *CR2-C-1428SC | HCC00 |
| | | 50 | KW90 | *CR2-C-14250 | HCC00 |
| | | 70 | KW115 | *CR2-C-14270 | HCC00 |
| | | 95 | KW115 | *CR2-C-14295 | HCC00 |
| | | 120 | KW150 | *CR2-C-142120 | HCC00 |
| | | 150 | KW200 | CR2-C-142150 | HCC00 |
| | | 185 | KW200 | CR2-C-142185 | HCC00 |
| | | 240 | KW250 | CR2-C-142240 | HCC00 |
| 17.2 | 3/4 | 10 | KW65 | *CR2-C-17210 | HCC00 |
| | | 16 | KW65 | *CR2-C-17216 | HCC00 |
| | | 25 | KW90 | *CR2-C-17225 | HCC00 |
| | | 35 | KW90 | *CR2-C-17235 | HCC00 |
| | | Ø8 mm | KW115 | *CR2-C-1728SC | HCC00 |
| | | 50 | KW115 | *CR2-C-17250 | HCC00 |
| | | 70 | KW115 | *CR2-C-17270 | HCC00 |
| | | 95 | KW115 | *CR2-C-17295 | HCC00 |
| | | 120 | KW150 | *CR2-C-172120 | HCC00 |
| | | 150 | KW200 | CR2-C-172150 | HCC00 |
| | | 185 | KW200 | CR2-C-172185 | HCC00 |
| | | 240 | KW250 | CR2-C-172240 | HCC00 |
| | | 300 | KW150x2 | CR2-D-172300 | HCD00 |
| 23.1 | 1 | 16 | KW150 | CR2-C-23116 | HCC00 |
| | | 25 | KW150 | CR2-C-23125 | HCC00 |
| | | 35 | KW150 | CR2-C-23135 | HCC00 |
| | | 50 | KW150 | CR2-C-23150 | HCC00 |
| | | 70 | KW150 | CR2-C-23170 | HCC00 |
| | | 95 | KW150 | CR2-C-23195 | HCC00 |
| | | 120 | KW200 | CR2-C-231120 | HCC00 |
| | | 150 | KW200 | CR2-C-231150 | HCC00 |
| | | 185 | KW200 | CR2-C-231185 | HCC00 |
| | | 240 | KW150x2 | CR2-D-231240 | HCD00 |

### Equipment




### Necessary Tools




### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

- SC means solid copper
- "*" means to meet UL Listed

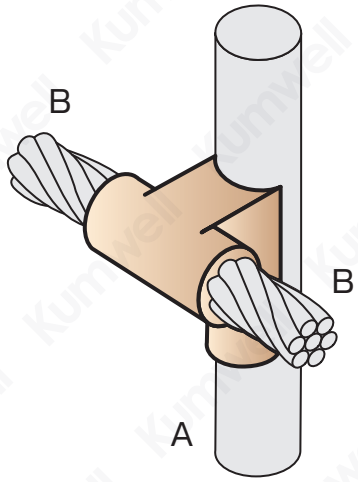
Note: Special requirement can be requested.

Kumwell

# CR3

## Cable to Ground Rod

Horizontal through cable to side of ground rod




### Equipment




### Necessary Tools




| Rod Size | | Conductor Size | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|---|---|
| A(mm.) | A(inch) | B(mm²) | | | |
| 12.7 | 1/2 | 10 | KW90 | CR3-E-12710 | HCC00 |
| | | 16 | KW90 | CR3-E-12716 | HCC00 |
| | | 25 | KW90 | CR3-E-12725 | HCC00 |
| | | 35 | KW90 | CR3-E-12735 | HCC00 |
| | | Ø8 mm | KW115 | CR3-E-1278SC | HCC00 |
| | | 50 | KW115 | CR3-E-12750 | HCC00 |
| | | Ø10 mm | KW115 | CR3-E-12710SC | HCC00 |
| | | 70 | KW115 | CR3-E-12770 | HCC00 |
| | | 95 | KW115 | CR3-E-12795 | HCC00 |
| | | 120 | KW150 | CR3-E-127120 | HCC00 |
| | | 150 | KW200 | CR3-E-127150 | HCC00 |
| | | 185 | KW200 | CR3-E-127185 | HCC00 |
| 14.2 | 5/8 | 10 | KW90 | CR3-E-14210 | HCC00 |
| | | 16 | KW90 | CR3-E-14216 | HCC00 |
| | | 25 | KW90 | CR3-E-14225 | HCC00 |
| | | 35 | KW90 | CR3-E-14235 | HCC00 |
| | | Ø8 mm | KW115 | CR3-E-1428SC | HCC00 |
| | | 50 | KW115 | CR3-E-14250 | HCC00 |
| | | Ø9.5 mm | KW115 | CR3-E-1429.5SC | HCC00 |
| | | 70 | KW115 | CR3-E-14270 | HCC00 |
| | | 95 | KW115 | CR3-E-14295 | HCC00 |
| | | 120 | KW150 | CR3-E-142120 | HCC00 |
| | | 150 | KW200 | CR3-E-142150 | HCC00 |
| | | 185 | KW250 | CR3-E-142185 | HCC00 |
| | | 240 | KW200x2 | CR3-J-142240 | HCD00 |
| 17.2 | 3/4 | 10 | KW90 | CR3-E-17210 | HCC00 |
| | | 16 | KW90 | CR3-E-17216 | HCC00 |
| | | 25 | KW90 | CR3-E-17225 | HCC00 |
| | | 35 | KW90 | CR3-E-17235 | HCC00 |
| | | Ø8 mm | KW115 | CR3-E-1728SC | HCC00 |
| | | 50 | KW115 | CR3-E-17250 | HCC00 |
| | | Ø9.5 mm | KW150 | CR3-E-1729.5SC | HCC00 |
| | | 70 | KW150 | CR3-E-17270 | HCC00 |
| | | 95 | KW150 | CR3-E-17295 | HCC00 |
| | | 120 | KW200 | CR3-E-172120 | HCC00 |
| | | 150 | KW250 | CR3-E-172150 | HCC00 |
| | | 185 | KW200x2 | CR3-J-172185 | HCD00 |
| | | 240 | KW200x2 | CR3-J-172240 | HCD00 |
| | | 300 | KW200x3 | CR3-J-172300 | HCD00 |

### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

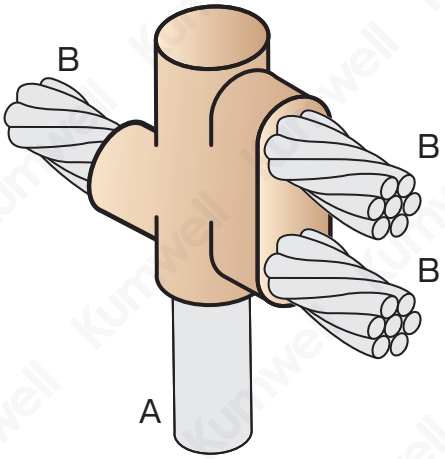
- SC means solid copper

Note: Special requirement can be requested.

# CR17

## Cable to Ground Rod

Horizontal parallel cable tap to ground rod




| Rod Size | | Conductor Size | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|---|---|
| A(mm.) | A(inch) | B(mm²) | | | |
| 12.7 | 1/2 | 25 | KW90 | CR17-C-12725 | HCC00 |
| | | 35 | KW90 | CR17-C-12735 | HCC00 |
| | | 50 | KW115 | CR17-C-12750 | HCC00 |
| | | 70 | KW150 | CR17-C-12770 | HCC00 |
| | | 95 | KW200 | CR17-C-12795 | HCC00 |
| | | 120 | KW200 | CR17-C-127120 | HCC00 |
| 14.2 | 5/8 | 25 | KW90 | CR17-C-14225 | HCC00 |
| | | 35 | KW115 | CR17-C-14235 | HCC00 |
| | | 50 | KW150 | CR17-C-14250 | HCC00 |
| | | 70 | KW200 | CR17-C-14270 | HCC00 |
| | | 95 | KW250 | CR17-CH-14295 | HCC00 |
| | | 120 | KW150x2 | CR17-D-142120 | HCD00 |
| | | 150 | KW200x2 | CR17-DH-142150 | HCD00 |
| 17.2 | 3/4 | 25 | KW90 | CR17-C-17225 | HCC00 |
| | | 35 | KW115 | CR17-C-17235 | HCC00 |
| | | 50 | KW150 | CR17-C-17250 | HCC00 |
| | | 70 | KW200 | CR17-C-17270 | HCC00 |
| | | 95 | KW250 | CR17-CH-17295 | HCC00 |
| | | 120 | KW150x2 | CR17-D-172120 | HCD00 |
| | | 150 | KW200x2 | CR17-DH-172150 | HCD00 |
| | | 185 | KW200x2 | CR17-DH-172185 | HCD00 |
| | | 240 | KW200x3 | CR17-DH-172240 | HCD00 |
| 23.1 | 1 | 25 | KW115 | CR17-C-23125 | HCC00 |
| | | 35 | KW150 | CR17-C-23135 | HCC00 |
| | | 50 | KW200 | CR17-C-23150 | HCC00 |
| | | 70 | KW250 | CR17-CH-23170 | HCC00 |
| | | 95 | KW150x2 | CR17-D-23195 | HCD00 |
| | | 120 | KW200x2 | CR17-DH-231120 | HCD00 |
| | | 150 | KW250x2 | CR17-DH-231150 | HCD00 |
| | | 185 | KW250x2 | CR17-DH-231185 | HCD00 |
| | | 240 | KW250x3 | CR17-DH-231240 | HCD00 |

### Equipment




### Necessary Tools




### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

- SC means solid copper

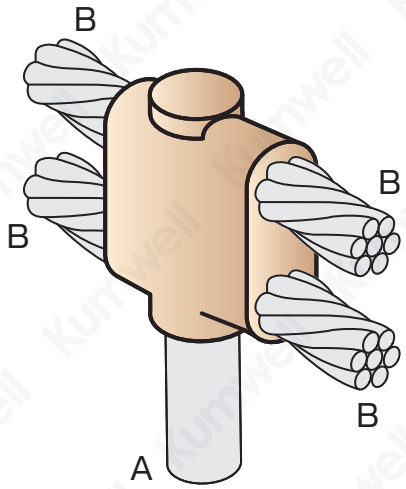
Note: Special requirement can be requested.

Kumwell

# CR24

## Cable to Ground Rod

Horizontal parallel through cables to ground rod




| Rod Size | | Conductor Size | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|---|---|
| A(mm.) | A(inch) | B(mm²) | | | |
| 12.7 | 1/2 | 25 | KW115 | CR24-C-12725 | HCC00 |
| | | 35 | KW115 | CR24-C-12735 | HCC00 |
| | | 50 | KW150 | CR24-C-12750 | HCC00 |
| | | 70 | KW200 | CR24-C-12770 | HCC00 |
| | | 95 | KW250 | CR24-CH-12795 | HCC00 |
| | | 120 | KW150x2 | CR24-D-127120 | HCD00 |
| 14.2 | 5/8 | 25 | KW115 | CR24-C-14225 | HCC00 |
| | | 35 | KW150 | CR24-C-14235 | HCC00 |
| | | 50 | KW200 | CR24-C-14250 | HCC00 |
| | | 70 | KW250 | CR24-CH-14270 | HCC00 |
| | | 95 | KW150x2 | CR24-D-14295 | HCD00 |
| | | 120 | KW200x2 | CR24-DH-142120 | HCD00 |
| | | 150 | KW250x2 | CR24-DH-142150 | HCD00 |
| | | 185 | KW250x2 | CR24-DH-142185 | HCD00 |
| | | 240 | KW250x3 | CR24-DH-142240 | HCD00 |
| 17.2 | 3/4 | 25 | KW115 | CR24-C-17225 | HCC00 |
| | | 35 | KW150 | CR24-C-17235 | HCC00 |
| | | 50 | KW200 | CR24-C-17250 | HCC00 |
| | | 70 | KW250 | CR24-CH-17270 | HCC00 |
| | | 95 | KW150x2 | CR24-D-17295 | HCD00 |
| | | 120 | KW200x2 | CR24-DH-172120 | HCD00 |
| | | 150 | KW250x2 | CR24-DH-172150 | HCD00 |
| | | 185 | KW250x2 | CR24-DH-172185 | HCD00 |
| | | 240 | KW250x2 | CR24-DH-172240 | HCD00 |
| 23.1 | 1 | 25 | KW150 | CR24-C-23125 | HCC00 |
| | | 35 | KW200 | CR24-C-23135 | HCC00 |
| | | 50 | KW250 | CR24-CH-23150 | HCC00 |
| | | 70 | KW150x2 | CR24-D-23170 | HCD00 |
| | | 95 | KW200x2 | CR24-DH-23195 | HCD00 |
| | | 120 | KW250x2 | CR24-DH-231120 | HCD00 |
| | | 150 | KW200x3 | CR24-DH-231150 | HCD00 |
| | | 185 | KW200x3 | CR24-DH-231185 | HCD00 |

### Equipment




### Necessary Tools




### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

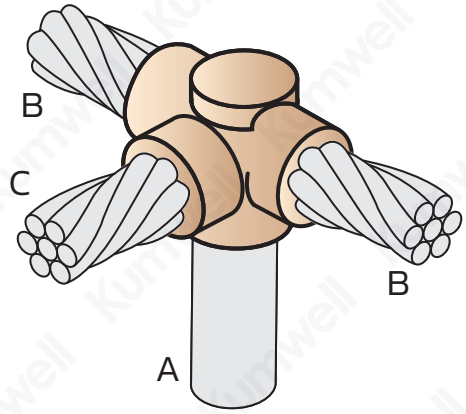
- For special rod size's requirement, please contact us

Note: Special requirement can be requested.

# CR25

## Cable to Ground Rod

Horizontal cable tap and run to ground rod




### Equipment




### Necessary Tools




### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

- For special rod size's requirement, please contact us
- For over 95 mm² conductor, we recommend to use handle clamp with cable clamp (Pls. see part tool and accessories) for perfect connection and long-lasting mold

| Rod Size | | Conductor Size | | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|---|---|---|
| A(mm.) | A(inch) | B(mm²) | C(mm²) | | | |
| 14.2 | 5/8 | 10 | 10 | KW65 | CR25-C-14210 | HCC00 |
| | | 16 | 16 | KW65 | CR25-C-14216 | HCC00 |
| | | 25 | 25 | KW90 | CR25-C-14225 | HCC00 |
| | | 35 | 35 | KW90 | CR25-C-14235 | HCC00 |
| | | 50 | 50 | KW115 | CR25-C-14250 | HCC00 |
| | | 70 | 70 | KW115 | CR25-C-14270 | HCC00 |
| | | 70 | 50 | KW115 | CR25-C-1427050 | HCC00 |
| | | 95 | 95 | KW150 | CR25-C-14295 | HCC00 |
| | | 95 | 95 | KW150 | CR25-C-14295S | HCC00 |
| | | 95 | 70 | KW150 | CR25-C-1429570 | HCC00 |
| | | 95 | 50 | KW150 | CR25-C-1429550 | HCC00 |
| | | 120 | 120 | KW150 | CR25-C-142120 | HCC00 |
| | | 120 | 95 | KW150 | CR25-C-14212095 | HCC00 |
| | | 120 | 70 | KW150 | CR25-C-14212070 | HCC00 |
| | | 120 | 50 | KW115 | CR25-C-14212050 | HCC00 |
| | | 150 | 150 | KW200 | CR25-C-142150 | HCC00 |
| | | 150 | 120 | KW200 | CR25-C-142150120 | HCC00 |
| | | 150 | 95 | KW200 | CR25-C-14215095 | HCC00 |
| | | 150 | 70 | KW200 | CR25-C-14215070 | HCC00 |
| | | 150 | 50 | KW150 | CR25-C-14215050 | HCC00 |
| | | 185 | 185 | KW250 | CR25-C-142185 | HCC00 |
| | | 185 | 95 | KW250 | CR25-C-14218595 | HCC00 |
| | | 185 | 70 | KW200 | CR25-C-14218570 | HCC00 |
| | | 240 | 240 | KW200x2 | CR25-D-142240 | HCD00 |
| | | 240 | 95 | KW200x2 | CR25-D-14224095 | HCD00 |
| | | 240 | 70 | KW150x2 | CR25-D-14224070 | HCD00 |
| 17.2 | 3/4 | 10 | 10 | KW65 | CR25-C-17210 | HCC00 |
| | | 16 | 16 | KW65 | CR25-C-17216 | HCC00 |
| | | 25 | 25 | KW90 | CR25-C-17225 | HCC00 |
| | | 35 | 35 | KW90 | CR25-C-17235 | HCC00 |
| | | 50 | 50 | KW115 | CR25-C-17250 | HCC00 |
| | | 70 | 70 | KW115 | CR25-C-17270 | HCC00 |
| | | 70 | 50 | KW115 | CR25-C-1727050 | HCC00 |
| | | 95 | 95 | KW150 | CR25-C-17295 | HCC00 |
| | | 95 | 70 | KW150 | CR25-C-1729570 | HCC00 |
| | | 95 | 50 | KW150 | CR25-C-1729550 | HCC00 |
| | | 120 | 120 | KW200 | CR25-C-172120 | HCC00 |
| | | 120 | 95 | KW200 | CR25-C-17212095 | HCC00 |
| | | 120 | 70 | KW200 | CR25-C-17212070 | HCC00 |
| | | 120 | 50 | KW200 | CR25-C-17212050 | HCC00 |
| | | 150 | 150 | KW250 | CR25-C-172150 | HCC00 |
| | | 150 | 95 | KW250 | CR25-C-17215095 | HCC00 |
| | | 150 | 70 | KW200 | CR25-C-17215070 | HCC00 |
| | | 150 | 50 | KW200 | CR25-C-17215050 | HCC00 |
| | | 185 | 185 | KW150x2 | CR25-D-172185 | HCD00 |
| | | 185 | 95 | KW150x2 | CR25-D-17218595 | HCD00 |
| | | 185 | 70 | KW150x2 | CR25-D-17218570 | HCD00 |
| | | 240 | 240 | KW200x2 | CR25-D-172240 | HCD00 |
| | | 240 | 95 | KW200x2 | CR25-D-17224095 | HCD00 |
| | | 240 | 70 | KW150x2 | CR25-D-17224070 | HCD00 |
| 23.1 | 1 | 16 | 16 | KW200 | CR25-C-23116 | HCC00 |
| | | 25 | 25 | KW200 | CR25-C-23125 | HCC00 |
| | | 35 | 35 | KW200 | CR25-C-23135 | HCC00 |
| | | 50 | 50 | KW250 | CR25-C-23150 | HCC00 |
| | | 70 | 70 | KW250 | CR25-C-23170 | HCC00 |
| | | 95 | 95 | KW250 | CR25-C-23195 | HCC00 |
| | | 120 | 120 | KW250 | CR25-C-231120 | HCC00 |
| | | 150 | 150 | KW250 | CR25-C-231150 | HCC00 |
| | | 185 | 185 | KW200x2 | CR25-D-231185 | HCD00 |
| | | 240 | 240 | KW200x2 | CR25-D-231240 | HCD00 |

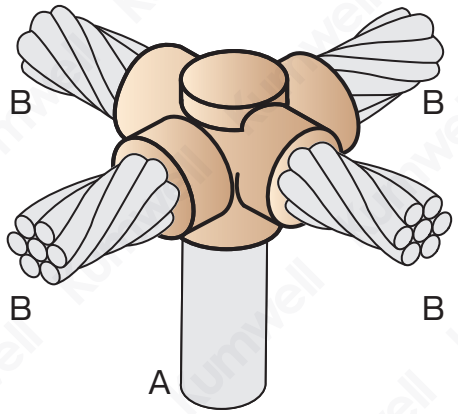
Note: Special requirement can be requested.

Kumwell

# CR33

## Cable to Ground Rod

Horizontal cable cross to ground rod




| Rod Size | | Conductor Size | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|---|---|
| A(mm.) | A(inch) | B(mm²) | | | |
| 14.2 | 5/8 | 10 | KW90 | CR33-C-14210 | HCC00 |
| | | 16 | KW90 | CR33-C-14216 | HCD00 |
| | | 25 | KW90 | CR33-C-14225 | HCC00 |
| | | 35 | KW90 | CR33-C-14235 | HCC00 |
| | | 50 | KW115 | CR33-C-14250 | HCC00 |
| | | 70 | KW115 | CR33-C-14270 | HCC00 |
| | | 95 | KW150 | CR33-C-14295S | HCC00 |
| | | 95 | KW150 | CR33-C-14295 | HCC00 |
| | | 120 | KW200 | CR33-C-142120 | HCC00 |
| | | 150 | KW250 | CR33-C-142150 | HCC00 |
| | | 185 | KW200x2 | CR33-D-142185 | HCC00 |
| | | 240 | KW250x2 | CR33-D-142240 | HCD00 |
| 17.2 | 3/4 | 10 | KW90 | CR33-C-17210 | HCC00 |
| | | 16 | KW90 | CR33-C-17216 | HCD00 |
| | | 25 | KW90 | CR33-C-17225 | HCC00 |
| | | 35 | KW90 | CR33-C-17235 | HCC00 |
| | | 50 | KW115 | CR33-C-17250 | HCC00 |
| | | 70 | KW115 | CR33-C-17270 | HCC00 |
| | | 95 | KW150 | CR33-C-17295 | HCC00 |
| | | 120 | KW200 | CR33-C-172120 | HCC00 |
| | | 150 | KW250 | CR33-C-172150 | HCC00 |
| | | 185 | KW200x2 | CR33-D-172185 | HCC00 |
| | | 240 | KW250x2 | CR33-D-172240 | HCD00 |
| 23.1 | 1 | 16 | KW200 | CR33-C-23116 | HCC00 |
| | | 25 | KW200 | CR33-C-23125 | HCC00 |
| | | 35 | KW200 | CR33-C-23135 | HCC00 |
| | | 50 | KW250 | CR33-C-23150 | HCC00 |
| | | 70 | KW250 | CR33-C-23170 | HCC00 |
| | | 95 | KW250 | CR33-C-23195 | HCC00 |
| | | 120 | KW250 | CR33-C-231120 | HCC00 |
| | | 150 | KW150x2 | CR33-D-231150 | HCD00 |
| | | 185 | KW250x2 | CR33-D-231185 | HCD00 |
| | | 240 | KW250x2 | CR33-D-231240 | HCD00 |

### Equipment




### Necessary Tools




### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

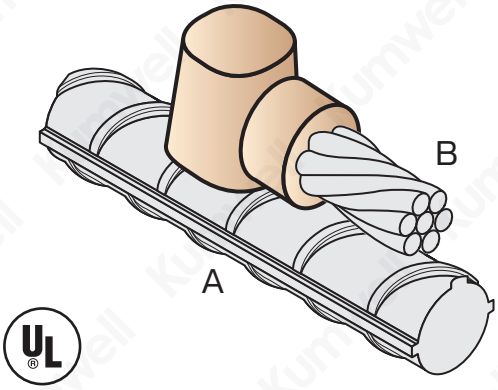
- For special rod size's requirement, please contact us
- For over 95 mm² conductor, we recommend to use handle clamp with cable clamp (Pls. see part tool and accessories) for perfect connection and long-lasting mold

Note: Special requirement can be requested.

# CRE1P

## Cable to Rebar Partially Wrapped Connection

Horizontal parallel cable tap to rebar




| Steel Size | Conductor Size | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|---|
| A(mm.) | B(mm²) | | | |
| 20 to 40 | 16 | KW45 | *CRE1P-A-16 | **HCA00 |
| 20 to 40 | 25 | KW45 | *CRE1P-A-25 | **HCA00 |
| 20 to 40 | 35 | KW45 | *CRE1P-A-35 | **HCA00 |
| 20 to 40 | 50 | KW90 | *CRE1P-C-50 | HCC00-Z |
| 20 to 40 | 70 | KW90 | *CRE1P-C-70 | HCC00-Z |
| 20 to 40 | 95 | KW90 | *CRE1P-C-95 | HCC00-Z |
| 20 to 40 | 120 | KW90 | *CRE1P-C-120 | HCC00-Z |
| 25 to 40 | 150 | KW150 | CRE1P-C-150 | HCC00-Z |
| 28 to 40 | 185 | KW200 | CRE1P-C-185 | HCC00-Z |
| 32 to 40 | 240 | KW200 | CRE1P-C-240 | HCC00-Z |
| 32 to 40 | 300 | KW250 | CRE1P-C-300 | HCC00-Z |

### Equipment




### Necessary Tools




### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

- For perfect welding, clean and remove oxide and moisture from reinforcement steel and conductor before making connection
- Kumwell CRE Mold provides ceramic fiber to prevent leakage
- "**HCA00" Handle clamp type A is completely assembled with the mold
- "*" means to meet UL Listed

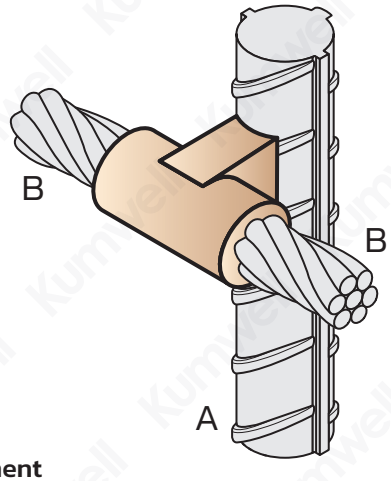
Note: Special requirement can be requested.

Kumwell

# CRE3P

## Cable to Rebar Partially Wrapped Connection

Horizontal through cable to vertical rebar




| Steel Size A(mm.) | Conductor Size B(mm²) | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|---|
| 20 to 40 | 16 | KW45 | CRE3P-C-16 | HCC00-U |
| 20 to 40 | 25 | KW45 | CRE3P-C-25 | HCC00-U |
| 20 to 40 | 35 | KW45 | CRE3P-C-35 | HCC00-U |
| 20 to 40 | 50 | KW90 | CRE3P-C-50 | HCC00-U |
| 20 to 40 | 70 | KW90 | CRE3P-C-70 | HCC00-U |
| 20 to 40 | 95 | KW90 | CRE3P-C-95 | HCC00-U |
| 20 to 40 | 120 | KW90 | CRE3P-C-120 | HCC00-U |
| 25 to 40 | 150 | KW115 | CRE3P-C-150 | HCC00-U |
| 28 to 40 | 185 | KW150 | CRE3P-CR-185 | HCC00-U |
| 32 to 40 | 240 | KW150 | CRE3P-CR-240 | HCC00-U |
| 32 to 40 | 300 | KW250 | CRE3P-CR-300 | HCC00-U |

### Equipment




### Necessary Tools




### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

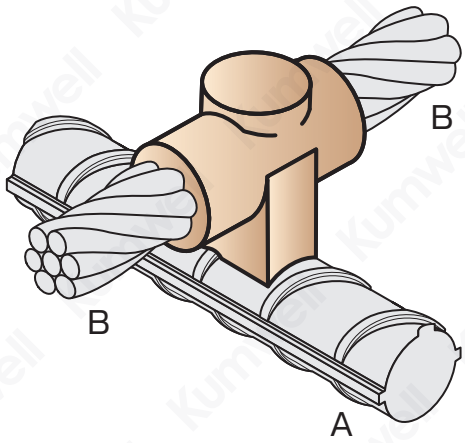
- For perfect welding, clean and remove oxide and moisture from reinforcement steel and conductor before making connection
- Kumwell CRE Mold provides ceramic fiber to prevent leakage

Note: Special requirement can be requested.

# CRE4P

## Cable to Rebar Partially Wrapped Connection

Horizontal cable cross to horizontal rebar




| Steel Size | Conductor Size | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|---|
| A(mm.) | B(mm²) | | | |
| 20 to 40 | 16 | KW65 | CRE4P-C-16 | HCC00-V |
| 20 to 40 | 25 | KW65 | CRE4P-C-25 | HCC00-V |
| 20 to 40 | 35 | KW90 | CRE4P-C-35 | HCC00-V |
| 20 to 40 | 50 | KW115 | CRE4P-C-50 | HCC00-V |
| 20 to 40 | 70 | KW115 | CRE4P-C-70 | HCC00-V |
| 20 to 40 | 95 | KW150 | CRE4P-C-95 | HCC00-V |
| 20 to 40 | 120 | KW150 | CRE4P-C-120 | HCC00-V |
| 25 to 40 | 150 | KW200 | CRE4P-C-150 | HCC00-V |
| 28 to 40 | 185 | KW250 | CRE4P-C-185 | HCC00-V |
| 32 to 40 | 240 | KW200x2 | CRE4P-D-240 | HCD00-V |
| 32 to 40 | 300 | KW200x2 | CRE4P-D-300 | HCD00-V |

### Equipment


Mold


Metal powder


Handle clamp


Steel disk

### Necessary Tools


Mold brush


Cable clean brush


File


Ceramic fiber


Flint igniter


Scraper



Tool box



Duct seal

### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

- For perfect welding, clean and remove oxide and moisture from reinforcement steel and conductor before making connection
- Kumwell CRE Mold provides ceramic fiber to prevent leakage

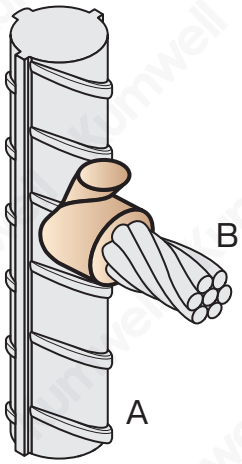
Note: Special requirement can be requested.

Kumwell

# CRE6P

## Cable to Rebar Partially Wrapped Connection

Horizontal cable tap to vertical rebar




| Steel Size | Conductor Size | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|---|
| A(mm.) | B(mm²) | | | |
| 20 to 40 | 16 | KW45 | CRE6P-C-16 | HCC00-X |
| 20 to 40 | 25 | KW45 | CRE6P-C-25 | HCC00-X |
| 20 to 40 | 35 | KW45 | CRE6P-C-35 | HCC00-X |
| 20 to 40 | 50 | KW90 | CRE6P-C-50 | HCC00-X |
| 20 to 40 | 70 | KW90 | CRE6P-C-70 | HCC00-X |
| 20 to 40 | 95 | KW90 | CRE6P-C-95 | HCC00-X |
| 20 to 40 | 120 | KW90 | CRE6P-C-120 | HCC00-X |
| 25 to 40 | 150 | KW115 | CRE6P-CR-150 | HCC00-X |
| 28 to 40 | 185 | KW150 | CRE6P-CR-185 | HCC00-X |
| 32 to 40 | 240 | KW200 | CRE6P-CR-240 | HCC00-X |
| 32 to 40 | 300 | KW250 | CRE6P-CR-300 | HCC00-X |

### Equipment


Mold


Metal powder


Handle clamp


Steel disk

### Necessary Tools


Mold brush


Cable clean brush


File


Ceramic fiber


Flint igniter


Scraper



Tool box



Duct seal

### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

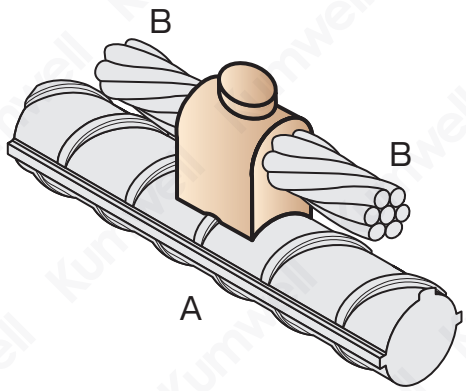
- For perfect welding, clean and remove oxide and moisture from reinforcement steel and conductor before making connection
- Kumwell CRE Mold provides ceramic fiber to prevent leakage

Note: Special requirement can be requested.

# CRE17P

## Cable to Rebar Partially Wrapped Connection

Horizontal parallel thru cable to horizontal rebar




| Steel Size | Conductor Size | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|---|
| A(mm.) | B(mm²) | | | |
| 20 to 40 | 16 | KW45 | CRE17P-C-16 | HCC00-Z |
| 20 to 40 | 25 | KW45 | CRE17P-C-25 | HCC00-Z |
| 20 to 40 | 35 | KW45 | CRE17P-C-35 | HCC00-Z |
| 20 to 40 | 50 | KW65 | CRE17P-C-50 | HCC00-Z |
| 20 to 40 | 70 | KW90 | CRE17P-C-70 | HCC00-Z |
| 20 to 40 | 95 | KW90 | CRE17P-C-95 | HCC00-Z |
| 20 to 40 | 120 | KW90 | CRE17P-C-120 | HCC00-Z |
| 25 to 40 | 150 | KW115 | CRE17P-C-150 | HCC00-Z |
| 28 to 40 | 185 | KW250 | CRE17P-C-185 | HCC00-Z |
| 32 to 40 | 240 | KW150x2 | CRE17P-D-240 | HCD00-Z |
| 32 to 40 | 300 | KW200x2 | CRE17P-D-300 | HCD00-Z |

### Equipment



| Mold | Metal powder |
|---|---|
| Handle clamp | Steel disk |

### Necessary Tools



| Mold brush | Cable clean brush | File | Ceramic fiber |
|---|---|---|---|
| Flint igniter | Scraper | Tool box | Duct seal |

### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

- For perfect welding, clean and remove oxide and moisture from reinforcement steel and conductor before making connection
- Kumwell CRE Mold provides ceramic fiber to prevent leakage

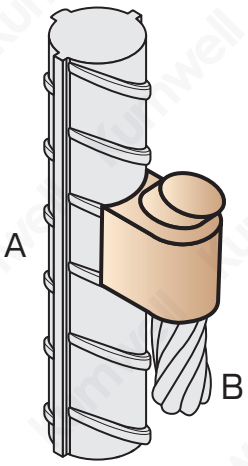
Note: Special requirement can be requested.

Kumwell

# CRE18P

## Cable to Rebar Partially Wrapped Connection

Vertical parallel down cable to vertical rebar




| Steel Size | Conductor Size | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|---|
| A(mm.) | B(mm²) | | | |
| 20 to 40 | 16 | KW90 | CRE18P-C-16 | HCC00-X |
| 20 to 40 | 25 | KW90 | CRE18P-C-25 | HCC00-X |
| 20 to 40 | 35 | KW115 | CRE18P-C-35 | HCC00-X |
| 20 to 40 | 50 | KW115 | CRE18P-C-50 | HCC00-X |
| 20 to 40 | 70 | KW150 | CRE18P-CR-70 | HCC00-X |
| 20 to 40 | 95 | KW200 | CRE18P-CR-95 | HCC00-X |
| 20 to 40 | 120 | KW250 | CRE18P-CR-120 | HCC00-X |
| 25 to 40 | 150 | KW250 | CRE18P-CR-150 | HCC00-X |
| 28 to 40 | 185 | KW150x2 | CRE18P-DR-185 | HCC00-X |
| 32 to 40 | 240 | KW150x2 | CRE18P-DR-240 | HCC00-X |
| 32 to 40 | 300 | KW200x2 | CRE18P-DR-300 | HCC00-X |

### Equipment


Mold


Metal powder


Handle clamp


Steel disk

### Necessary Tools


Mold brush


Cable clean brush


File


Ceramic fiber


Flint igniter


Scraper



Tool box



Duct seal

### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

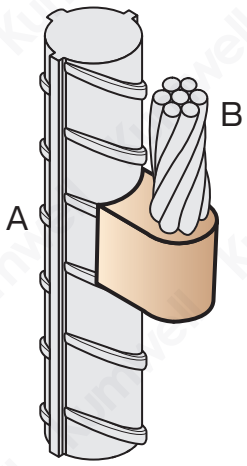
- For perfect welding, clean and remove oxide and moisture from reinforcement steel and conductor before making connection
- Kumwell CRE Mold provides ceramic fiber to prevent leakage

Note: Special requirement can be requested.

# CRE19P

## Cable to Rebar Partially Wrapped Connection

Horizontal parallel thru cable to horizontal rebar




| Steel Size | Conductor Size | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|---|
| A(mm.) | B(mm²) | | | |
| 20 to 40 | 16 | KW90 | CRE19P-C-16 | HCC00-X |
| 20 to 40 | 25 | KW90 | CRE19P-C-25 | HCC00-X |
| 20 to 40 | 35 | KW115 | CRE19P-CR-35 | HCC00-X |
| 20 to 40 | 50 | KW115 | CRE19P-CR-50 | HCC00-X |
| 20 to 40 | 70 | KW150 | CRE19P-CR-70 | HCC00-X |
| 20 to 40 | 95 | KW200 | CRE19P-CR-95 | HCC00-X |
| 20 to 40 | 120 | KW250 | CRE19P-CR-120 | HCC00-X |
| 25 to 40 | 150 | KW250 | CRE19P-CR-150 | HCC00-X |
| 28 to 40 | 185 | KW150x2 | CRE19P-DR-185 | HCD00-X |
| 32 to 40 | 240 | KW150x2 | CRE19P-DR-240 | HCD00-X |
| 32 to 40 | 300 | KW200x2 | CRE19P-DR-300 | HCD00-X |

### Equipment

| | |
|---|---|
|  Mold |  Metal powder |
|  Handle clamp |  Steel disk |

### Necessary Tools

| | | | |
|---|---|---|---|
|  Mold brush |  Cable clean brush |  File |  Ceramic fiber |
|  Flint igniter |  Scraper |  Tool box |  Duct seal |

### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

- For perfect welding, clean and remove oxide and moisture from reinforcement steel and conductor before making connection
- Kumwell CRE Mold provides ceramic fiber to prevent leakage

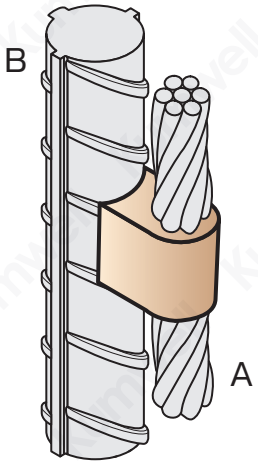
Note: Special requirement can be requested.

Kumwell

# CRE2OP

## Cable to Rebar Partially Wrapped Connection

Vertical parallel thru cable to vertical rebar




| Steel Size | Conductor Size | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|---|
| A(mm.) | B(mm²) | | | |
| 20 to 40 | 16 | KW90 | CRE2OP-C-16 | HCC00-X |
| 20 to 40 | 25 | KW90 | CRE2OP-C-25 | HCC00-X |
| 20 to 40 | 35 | KW115 | CRE2OP-CR-35 | HCC00-X |
| 20 to 40 | 50 | KW115 | CRE2OP-CR-50 | HCC00-X |
| 20 to 40 | 70 | KW150 | CRE2OP-CR-70 | HCC00-X |
| 20 to 40 | 95 | KW200 | CRE2OP-CR-95 | HCC00-X |
| 20 to 40 | 120 | KW250 | CRE2OP-CR-120 | HCC00-X |
| 25 to 40 | 150 | KW250 | CRE2OP-CR-150 | HCC00-X |
| 28 to 40 | 185 | KW150x2 | CRE2OP-DR-185 | HCD00-X |
| 32 to 40 | 240 | KW150x2 | CRE2OP-DR-240 | HCD00-X |
| 32 to 40 | 300 | KW200x2 | CRE2OP-DR-300 | HCD00-X |

### Equipment




### Necessary Tools




### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

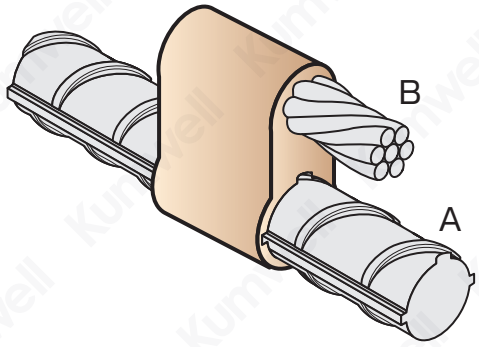
- For perfect welding, clean and remove oxide and moisture from reinforcement steel and conductor before making connection
- Kumwell CRE Mold provides ceramic fiber to prevent leakage

Note: Special requirement can be requested.

# CRE1

## Cable to Rebar Fully Wrapped Connection

Horizontal parallel cable to horizontal rebar




| Steel Size | Conductor Size | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|---|
| A(mm.) | B(mm²) | | | |
| 10 | 16 | KW115 | CRE1-C-1610R | HCC00 |
| | 25 | KW115 | CRE1-C-2510R | HCC00 |
| | 35 | KW115 | CRE1-C-3510R | HCC00 |
| | 50 | KW150 | CRE1-C-5010R | HCC00 |
| | 70 | KW150 | CRE1-C-7010R | HCC00 |
| | 95 | KW200 | CRE1-CH-9510R | HCC00 |
| | 120 | KW200 | CRE1-CH-12010R | HCC00 |
| 12 | 16 | KW115 | CRE1-C-1612R | HCC00 |
| | 25 | KW115 | CRE1-C-2512R | HCC00 |
| | 35 | KW115 | CRE1-C-3512R | HCC00 |
| | 50 | KW150 | CRE1-C-5012R | HCC00 |
| | 70 | KW150 | CRE1-C-7012R | HCC00 |
| | 95 | KW200 | CRE1-CH-9512R | HCC00 |
| | 120 | KW200 | CRE1-CH-12012R | HCC00 |
| 16 | 16 | KW115 | CRE1-C-1616R | HCC00 |
| | 25 | KW115 | CRE1-C-2516R | HCC00 |
| | 35 | KW115 | CRE1-C-3516R | HCC00 |
| | 50 | KW150 | CRE1-C-5016R | HCC00 |
| | 70 | KW200 | CRE1-CH-7016R | HCC00 |
| | 95 | KW200 | CRE1-CH-9516R | HCC00 |
| | 120 | KW200 | CRE1-CH-12016R | HCC00 |
| 20 | 16 | KW150 | CRE1-C-1620R | HCC00 |
| | 25 | KW150 | CRE1-C-2520R | HCC00 |
| | 35 | KW150 | CRE1-C-3520R | HCC00 |
| | 50 | KW200 | CRE1-CH-5020R | HCC00 |
| | 70 | KW200 | CRE1-CH-7020R | HCC00 |
| | 95 | KW250 | CRE1-CH-9520R | HCC00 |
| | 120 | KW250 | CRE1-CH-12020R | HCC00 |
| 25 | 16 | KW150 | CRE1-CH-1625R | HCC00 |
| | 25 | KW150 | CRE1-CH-2525R | HCC00 |
| | 35 | KW200 | CRE1-CH-3525R | HCC00 |
| | 50 | KW200 | CRE1-CH-5025R | HCC00 |
| | 70 | KW250 | CRE1-CH-7025R | HCC00 |
| | 95 | KW250 | CRE1-CH-9525R | HCC00 |
| | 120 | KW250 | CRE1-CH-12025R | HCC00 |
| 30 | 16 | KW200 | CRE1-CH-1630R | HCC00 |
| | 25 | KW200 | CRE1-CH-2530R | HCC00 |
| | 35 | KW200 | CRE1-CH-3530R | HCC00 |
| | 50 | KW250 | CRE1-CH-5030R | HCC00 |
| | 70 | KW250 | CRE1-CH-7030R | HCC00 |
| | 95 | KW250 | CRE1-CH-9530R | HCC00 |
| | 120 | KW250 | CRE1-CH-12030R | HCC00 |

### Equipment




### Necessary Tools




### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

- For perfect welding, clean and remove oxide and moisture from reinforcement steel and conductor before making connection
- Kumwell CRE Mold provides ceramic fiber to prevent leakage

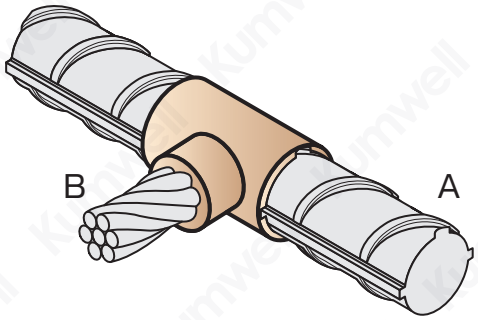
Note: Special requirement can be requested.

Kumwell

# CRE2

## Cable to Rebar Fully Wrapped Connection

Horizontal cable tap to horizontal rebar




### Equipment




### Necessary Tools




### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

- For perfect welding, clean and remove oxide and moisture from reinforcement steel and conductor before making connection
- Kumwell CRE Mold provides ceramic fiber to prevent leakage

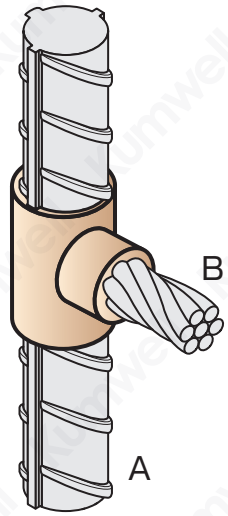
| Steel Size | Conductor Size | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|---|
| A(mm.) | B(mm²) | | | |
| 10 | 16 | KW45 | CRE2-C-1610R | HCC00 |
| | 25 | KW45 | CRE2-C-2510R | HCC00 |
| | 35 | KW65 | CRE2-C-3510R | HCC00 |
| | 50 | KW90 | CRE2-C-5010R | HCC00 |
| | 70 | KW90 | CRE2-C-7010R | HCC00 |
| | 95 | KW115 | CRE2-C-9510R | HCC00 |
| | 120 | KW115 | CRE2-C-12010R | HCC00 |
| | 150 | KW150 | CRE2-C-15010R | HCC00 |
| | 185 | KW150 | CRE2-C-18510R | HCC00 |
| | 240 | KW200 | CRE2-C-24010R | HCC00 |
| | 300 | KW200 | CRE2-C-30010R | HCC00 |
| 12 | 16 | KW45 | CRE2-C-1612R | HCC00 |
| | 25 | KW45 | CRE2-C-2512R | HCC00 |
| | 35 | KW65 | CRE2-C-3512R | HCC00 |
| | 50 | KW90 | CRE2-C-5012R | HCC00 |
| | 70 | KW90 | CRE2-C-7012R | HCC00 |
| | 95 | KW115 | CRE2-C-9512R | HCC00 |
| | 120 | KW115 | CRE2-C-12012R | HCC00 |
| | 150 | KW150 | CRE2-C-15012R | HCC00 |
| | 185 | KW150 | CRE2-C-18512R | HCC00 |
| | 240 | KW200 | CRE2-C-24012R | HCC00 |
| | 300 | KW200 | CRE2-C-30012R | HCC00 |
| 16 | 16 | KW90 | CRE2-C-1616R | HCC00 |
| | 25 | KW90 | CRE2-C-2516R | HCC00 |
| | 35 | KW90 | CRE2-C-3516R | HCC00 |
| | 50 | KW115 | CRE2-C-5016R | HCC00 |
| | 70 | KW115 | CRE2-C-7016R | HCC00 |
| | 95 | KW150 | CRE2-C-9516R | HCC00 |
| | 120 | KW150 | CRE2-C-12016R | HCC00 |
| | 150 | KW200 | CRE2-C-15016R | HCC00 |
| | 185 | KW200 | CRE2-C-18516R | HCC00 |
| | 240 | KW250 | CRE2-C-24016R | HCC00 |
| | 300 | KW150x2 | CRE2-D-30016R | HCD00 |
| 20 | 16 | KW115 | CRE2-C-1620R | HCC00 |
| | 25 | KW115 | CRE2-C-2520R | HCC00 |
| | 35 | KW115 | CRE2-C-3520R | HCC00 |
| | 50 | KW150 | CRE2-C-5020R | HCC00 |
| | 70 | KW150 | CRE2-C-7020R | HCC00 |
| | 95 | KW200 | CRE2-C-9520R | HCC00 |
| | 120 | KW200 | CRE2-C-12020R | HCC00 |
| | 150 | KW200 | CRE2-C-15020R | HCC00 |
| | 185 | KW250 | CRE2-C-18520R | HCC00 |
| | 240 | KW150x2 | CRE2-D-24020R | HCD00 |
| | 300 | KW200x2 | CRE2-D-30020R | HCD00 |
| 25 | 16 | KW200 | CRE2-C-1625R | HCC00 |
| | 25 | KW200 | CRE2-C-2525R | HCC00 |
| | 35 | KW200 | CRE2-C-3525R | HCC00 |
| | 50 | KW200 | CRE2-C-5025R | HCC00 |
| | 70 | KW250 | CRE2-C-7025R | HCC00 |
| | 95 | KW250 | CRE2-C-9525R | HCC00 |
| | 120 | KW250 | CRE2-C-12025R | HCC00 |
| | 150 | KW150x2 | CRE2-D-15025R | HCD00 |
| | 185 | KW150x2 | CRE2-D-18525R | HCD00 |
| | 240 | KW200x2 | CRE2-D-24025R | HCD00 |
| | 300 | KW200x2 | CRE2-D-30025R | HCD00 |
| 30 | 16 | KW250 | CRE2-C-1630R | HCC00 |
| | 25 | KW250 | CRE2-C-2530R | HCC00 |
| | 35 | KW250 | CRE2-C-3530R | HCC00 |
| | 50 | KW150x2 | CRE2-D-5030R | HCD00 |
| | 70 | KW150x2 | CRE2-D-7030R | HCD00 |
| | 95 | KW150x2 | CRE2-D-9530R | HCD00 |
| | 120 | KW200x2 | CRE2-D-12030R | HCD00 |
| | 150 | KW200x2 | CRE2-D-15030R | HCD00 |
| | 185 | KW250x2 | CRE2-D-18530R | HCD00 |
| | 240 | KW200x3 | CRE2-D-24030R | HCD00 |
| | 300 | KW200x3 | CRE2-D-30030R | HCD00 |

Note: Special requirement can be requested.

# CRE6

## Cable to Rebar Fully Wrapped Connection

Horizontal cable tap to vertical rebar




| Steel Size | Conductor Size | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|---|
| A(mm.) | B(mm²) | | | |
| 10 | 16 | KW65 | CRE6-CL-1610R | HCC00 |
| | 25 | KW65 | CRE6-CL-2510R | HCC00 |
| | 35 | KW65 | CRE6-CL-3510R | HCC00 |
| | 50 | KW115 | CRE6-CL-5010R | HCC00 |
| | 70 | KW115 | CRE6-CL-7010R | HCC00 |
| | 95 | KW150 | CRE6-CL-9510R | HCC00 |
| | 120 | KW150 | CRE6-CL-12010R | HCC00 |
| 12 | 16 | KW65 | CRE6-CL-1612R | HCC00 |
| | 25 | KW65 | CRE6-CL-2512R | HCC00 |
| | 35 | KW65 | CRE6-CL-3512R | HCC00 |
| | 50 | KW115 | CRE6-CL-5012R | HCC00 |
| | 70 | KW115 | CRE6-CL-7012R | HCC00 |
| | 95 | KW150 | CRE6-CL-9512R | HCC00 |
| | 120 | KW150 | CRE6-CL-12012R | HCC00 |
| 16 | 16 | KW65 | CRE6-CL-1616R | HCC00 |
| | 25 | KW65 | CRE6-CL-2516R | HCC00 |
| | 35 | KW65 | CRE6-CL-3516R | HCC00 |
| | 50 | KW115 | CRE6-CL-5016R | HCC00 |
| | 70 | KW115 | CRE6-CL-7016R | HCC00 |
| | 95 | KW150 | CRE6-CL-9516R | HCC00 |
| | 120 | KW150 | CRE6-CL-12016R | HCC00 |
| 20 | 16 | KW65 | CRE6-CL-1620R | HCC00 |
| | 25 | KW65 | CRE6-CL-2520R | HCC00 |
| | 35 | KW65 | CRE6-CL-3520R | HCC00 |
| | 50 | KW115 | CRE6-CL-5020R | HCC00 |
| | 70 | KW115 | CRE6-CL-7020R | HCC00 |
| | 95 | KW150 | CRE6-CL-9520R | HCC00 |
| | 120 | KW150 | CRE6-CL-12020R | HCC00 |
| 25 | 16 | KW65 | CRE6-CL-1625R | HCC00 |
| | 25 | KW65 | CRE6-CL-2525R | HCC00 |
| | 35 | KW65 | CRE6-CL-3525R | HCC00 |
| | 50 | KW115 | CRE6-CL-5025R | HCC00 |
| | 70 | KW115 | CRE6-CL-7025R | HCC00 |
| | 95 | KW150 | CRE6-CL-9525R | HCC00 |
| | 120 | KW150 | CRE6-CL-12025R | HCC00 |
| 30 | 16 | KW65 | CRE6-CL-1630R | HCC00 |
| | 25 | KW65 | CRE6-CL-2530R | HCC00 |
| | 35 | KW65 | CRE6-CL-3530R | HCC00 |
| | 50 | KW115 | CRE6-CL-5030R | HCC00 |
| | 70 | KW115 | CRE6-CL-7030R | HCC00 |
| | 95 | KW150 | CRE6-CL-9530R | HCC00 |
| | 120 | KW150 | CRE6-CL-12030R | HCC00 |

### Equipment




### Necessary Tools




### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

- For perfect welding, clean and remove oxide and moisture from reinforcement steel and conductor before making connection
- Kumwell CRE Mold provides ceramic fiber to prevent leakage

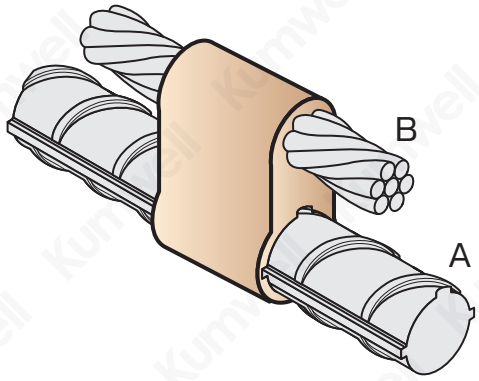
Note: Special requirement can be requested.

Kumwell

# CRE17

## Cable to Rebar Fully Wrapped Connection

Horizontal parallel thru cable to horizontal rebar




| Steel Size | Conductor Size | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|---|
| A(mm.) | B(mm²) | | | |
| 10 | 16 | KW115 | CRE17-C-1610R | HCC00 |
| | 25 | KW115 | CRE17-C-2510R | HCC00 |
| | 35 | KW115 | CRE17-C-3510R | HCC00 |
| | 50 | KW150 | CRE17-C-5010R | HCC00 |
| | 70 | KW150 | CRE17-C-7010R | HCC00 |
| | 95 | KW200 | CRE17-CH-9510R | HCC00 |
| | 120 | KW200 | CRE17-CH-12010R | HCC00 |
| 12 | 16 | KW115 | CRE17-C-1612R | HCC00 |
| | 25 | KW115 | CRE17-C-2512R | HCC00 |
| | 35 | KW115 | CRE17-C-3512R | HCC00 |
| | 50 | KW150 | CRE17-C-5012R | HCC00 |
| | 70 | KW150 | CRE17-C-7012R | HCC00 |
| | 95 | KW200 | CRE17-CH-9512R | HCC00 |
| | 120 | KW200 | CRE17-CH-12012R | HCC00 |
| 16 | 16 | KW115 | CRE17-C-1616R | HCC00 |
| | 25 | KW115 | CRE17-C-2516R | HCC00 |
| | 35 | KW115 | CRE17-C-3516R | HCC00 |
| | 50 | KW150 | CRE17-C-5016R | HCC00 |
| | 70 | KW200 | CRE17-CH-7016R | HCC00 |
| | 95 | KW200 | CRE17-CH-9516R | HCC00 |
| | 120 | KW200 | CRE17-CH-12016R | HCC00 |
| 20 | 16 | KW150 | CRE17-C-1620R | HCC00 |
| | 25 | KW150 | CRE17-C-2520R | HCC00 |
| | 35 | KW150 | CRE17-C-3520R | HCC00 |
| | 50 | KW200 | CRE17-CH-5020R | HCC00 |
| | 70 | KW200 | CRE17-CH-7020R | HCC00 |
| | 95 | KW250 | CRE17-CH-9520R | HCC00 |
| | 120 | KW250 | CRE17-CH-12020R | HCC00 |
| 25 | 16 | KW150 | CRE17-C-1625R | HCC00 |
| | 25 | KW150 | CRE17-C-2525R | HCC00 |
| | 35 | KW200 | CRE17-CH-3525R | HCC00 |
| | 50 | KW200 | CRE17-CH-5025R | HCC00 |
| | 70 | KW250 | CRE17-CH-7025R | HCC00 |
| | 95 | KW250 | CRE17-CH-9525R | HCC00 |
| | 120 | KW250 | CRE17-CH-12025R | HCC00 |
| 30 | 16 | KW200 | CRE17-CH-1630R | HCC00 |
| | 25 | KW200 | CRE17-CH-2530R | HCC00 |
| | 35 | KW200 | CRE17-CH-3530R | HCC00 |
| | 50 | KW250 | CRE17-CH-5030R | HCC00 |
| | 70 | KW250 | CRE17-CH-7030R | HCC00 |
| | 95 | KW250 | CRE17-CH-9530R | HCC00 |
| | 120 | KW250 | CRE17-CH-12030R | HCC00 |

### Equipment




### Necessary Tools




### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

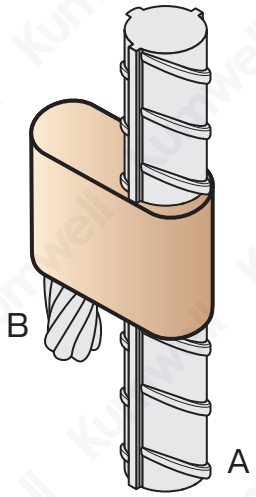
- For perfect welding, clean and remove oxide and moisture from reinforcement steel and conductor before making connection
- Kumwell CRE Mold provides ceramic fiber to prevent leakage

Note: Special requirement can be requested.

# CRE18

## Cable to Rebar Fully Wrapped Connection

Vertical parallel down cable to vertical rebar




| Steel Size | Conductor Size | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|---|
| A(mm.) | B(mm²) | | | |
| 10 | 16 | KW115 | CRE18-CL-1610R | HCC00 |
| | 25 | KW115 | CRE18-CL-2510R | HCC00 |
| | 35 | KW115 | CRE18-CL-3510R | HCC00 |
| | 50 | KW150 | CRE18-CL-5010R | HCC00 |
| | 70 | KW150 | CRE18-CL-7010R | HCC00 |
| | 95 | KW200 | CRE18-CL-9510R | HCC00 |
| | 120 | KW200 | CRE18-CL-12010R | HCC00 |
| 12 | 16 | KW115 | CRE18-CL-1612R | HCC00 |
| | 25 | KW115 | CRE18-CL-2512R | HCC00 |
| | 35 | KW115 | CRE18-CL-3512R | HCC00 |
| | 50 | KW150 | CRE18-CL-5012R | HCC00 |
| | 70 | KW150 | CRE18-CL-7012R | HCC00 |
| | 95 | KW200 | CRE18-CL-9512R | HCC00 |
| | 120 | KW200 | CRE18-CL-12012R | HCC00 |
| 16 | 16 | KW115 | CRE18-CL-1616R | HCC00 |
| | 25 | KW115 | CRE18-CL-2516R | HCC00 |
| | 35 | KW115 | CRE18-CL-3516R | HCC00 |
| | 50 | KW150 | CRE18-CL-5016R | HCC00 |
| | 70 | KW200 | CRE18-CL-7016R | HCC00 |
| | 95 | KW200 | CRE18-CL-9516R | HCC00 |
| | 120 | KW200 | CRE18-CL-12016R | HCC00 |
| 20 | 16 | KW150 | CRE18-CL-1620R | HCC00 |
| | 25 | KW150 | CRE18-CL-2520R | HCC00 |
| | 35 | KW150 | CRE18-CL-3520R | HCC00 |
| | 50 | KW200 | CRE18-CL-5020R | HCC00 |
| | 70 | KW200 | CRE18-CL-7020R | HCC00 |
| | 95 | KW250 | CRE18-CL-9520R | HCC00 |
| | 120 | KW250 | CRE18-CL-12020R | HCC00 |
| 25 | 16 | KW150 | CRE18-CL-1625R | HCC00 |
| | 25 | KW150 | CRE18-CL-2525R | HCC00 |
| | 35 | KW200 | CRE18-CL-3525R | HCC00 |
| | 50 | KW200 | CRE18-CL-5025R | HCC00 |
| | 70 | KW250 | CRE18-CL-7025R | HCC00 |
| | 95 | KW250 | CRE18-CL-9525R | HCC00 |
| | 120 | KW250 | CRE18-CL-12025R | HCC00 |
| 30 | 16 | KW200 | CRE18-CL-1630R | HCC00 |
| | 25 | KW200 | CRE18-CL-2530R | HCC00 |
| | 35 | KW200 | CRE18-CL-3530R | HCC00 |
| | 50 | KW250 | CRE18-CL-5030R | HCC00 |
| | 70 | KW250 | CRE18-CL-7030R | HCC00 |
| | 95 | KW250 | CRE18-CL-9530R | HCC00 |
| | 120 | KW250 | CRE18-CL-12030R | HCC00 |

### Equipment




### Necessary Tools




### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

- For perfect welding, clean and remove oxide and moisture from reinforcement steel and conductor before making connection
- Kumwell CRE Mold provides ceramic fiber to prevent leakage

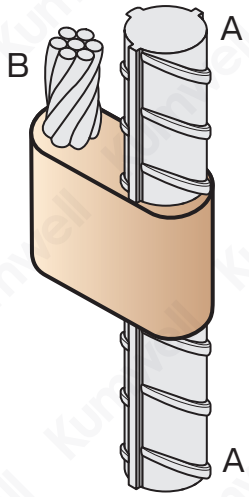
Note: Special requirement can be requested.

Kumwell

# CRE19

## Cable to Rebar Fully Wrapped Connection

Vertical parallel up cable to vertical rebar




### Equipment




### Necessary Tools




| Steel Size | Conductor Size | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|---|
| A(mm.) | B(mm²) | | | |
| 10 | 16 | KW115 | CRE19-CL-1610R | HCC00 |
| | 25 | KW115 | CRE19-CL-2510R | HCC00 |
| | 35 | KW115 | CRE19-CL-3510R | HCC00 |
| | 50 | KW150 | CRE19-CL-5010R | HCC00 |
| | 70 | KW150 | CRE19-CL-7010R | HCC00 |
| | 95 | KW200 | CRE19-CL-9510R | HCC00 |
| | 120 | KW200 | CRE19-CL-12010R | HCC00 |
| 12 | 16 | KW115 | CRE19-CL-1612R | HCC00 |
| | 25 | KW115 | CRE19-CL-2512R | HCC00 |
| | 35 | KW115 | CRE19-CL-3512R | HCC00 |
| | 50 | KW150 | CRE19-CL-5012R | HCC00 |
| | 70 | KW150 | CRE19-CL-7012R | HCC00 |
| | 95 | KW200 | CRE19-CL-9512R | HCC00 |
| | 120 | KW200 | CRE19-CL-12012R | HCC00 |
| 16 | 16 | KW115 | CRE19-CL-1616R | HCC00 |
| | 25 | KW115 | CRE19-CL-2516R | HCC00 |
| | 35 | KW115 | CRE19-CL-3516R | HCC00 |
| | 50 | KW150 | CRE19-CL-5016R | HCC00 |
| | 70 | KW200 | CRE19-CL-7016R | HCC00 |
| | 95 | KW200 | CRE19-CL-9516R | HCC00 |
| | 120 | KW200 | CRE19-CL-12016R | HCC00 |
| 20 | 16 | KW150 | CRE19-CL-1620R | HCC00 |
| | 25 | KW150 | CRE19-CL-2520R | HCC00 |
| | 35 | KW150 | CRE19-CL-3520R | HCC00 |
| | 50 | KW200 | CRE19-CL-5020R | HCC00 |
| | 70 | KW200 | CRE19-CL-7020R | HCC00 |
| | 95 | KW250 | CRE19-CL-9520R | HCC00 |
| | 120 | KW250 | CRE19-CL-12020R | HCC00 |
| 25 | 16 | KW150 | CRE19-CL-1625R | HCC00 |
| | 25 | KW150 | CRE19-CL-2525R | HCC00 |
| | 35 | KW200 | CRE19-CL-3525R | HCC00 |
| | 50 | KW200 | CRE19-CL-5025R | HCC00 |
| | 70 | KW250 | CRE19-CL-7025R | HCC00 |
| | 95 | KW250 | CRE19-CL-9525R | HCC00 |
| | 120 | KW250 | CRE19-CL-12025R | HCC00 |
| 30 | 16 | KW200 | CRE19-CL-1630R | HCC00 |
| | 25 | KW200 | CRE19-CL-2530R | HCC00 |
| | 35 | KW200 | CRE19-CL-3530R | HCC00 |
| | 50 | KW250 | CRE19-CL-5030R | HCC00 |
| | 70 | KW250 | CRE19-CL-7030R | HCC00 |
| | 95 | KW250 | CRE19-CL-9530R | HCC00 |
| | 120 | KW250 | CRE19-CL-12030R | HCC00 |

### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

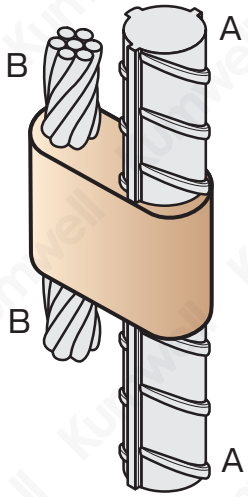
- For perfect welding, clean and remove oxide and moisture from reinforcement steel and conductor before making connection
- Kumwell CRE Mold provides ceramic fiber to prevent leakage

Note: Special requirement can be requested.

# CRE20

## Cable to Rebar Fully Wrapped Connection

Vertical parallel thru cable to vertical rebar




| Steel Size | Conductor Size | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|---|
| A(mm.) | B(mm²) | | | |
| 10 | 16 | KW115 | CRE20-CL-1610R | HCC00 |
| | 25 | KW115 | CRE20-CL-2510R | HCC00 |
| | 35 | KW115 | CRE20-CL-3510R | HCC00 |
| | 50 | KW150 | CRE20-CL-5010R | HCC00 |
| | 70 | KW150 | CRE20-CL-7010R | HCC00 |
| | 95 | KW200 | CRE20-CL-9510R | HCC00 |
| | 120 | KW200 | CRE20-CL-12010R | HCC00 |
| 12 | 16 | KW115 | CRE20-CL-1612R | HCC00 |
| | 25 | KW115 | CRE20-CL-2512R | HCC00 |
| | 35 | KW115 | CRE20-CL-3512R | HCC00 |
| | 50 | KW150 | CRE20-CL-5012R | HCC00 |
| | 70 | KW150 | CRE20-CL-7012R | HCC00 |
| | 95 | KW200 | CRE20-CL-9512R | HCC00 |
| | 120 | KW200 | CRE20-CL-12012R | HCC00 |
| 16 | 16 | KW115 | CRE20-CL-1616R | HCC00 |
| | 25 | KW115 | CRE20-CL-2516R | HCC00 |
| | 35 | KW115 | CRE20-CL-3516R | HCC00 |
| | 50 | KW150 | CRE20-CL-5016R | HCC00 |
| | 70 | KW200 | CRE20-CL-7016R | HCC00 |
| | 95 | KW200 | CRE20-CL-9516R | HCC00 |
| | 120 | KW200 | CRE20-CL-12016R | HCC00 |
| 20 | 16 | KW150 | CRE20-CL-1620R | HCC00 |
| | 25 | KW150 | CRE20-CL-2520R | HCC00 |
| | 35 | KW150 | CRE20-CL-3520R | HCC00 |
| | 50 | KW200 | CRE20-CL-5020R | HCC00 |
| | 70 | KW200 | CRE20-CL-7020R | HCC00 |
| | 95 | KW250 | CRE20-CL-9520R | HCC00 |
| | 120 | KW250 | CRE20-CL-12020R | HCC00 |
| 25 | 16 | KW150 | CRE20-CL-1625R | HCC00 |
| | 25 | KW150 | CRE20-CL-2525R | HCC00 |
| | 35 | KW200 | CRE20-CL-3525R | HCC00 |
| | 50 | KW200 | CRE20-CL-5025R | HCC00 |
| | 70 | KW250 | CRE20-CL-7025R | HCC00 |
| | 95 | KW250 | CRE20-CL-9525R | HCC00 |
| | 120 | KW250 | CRE20-CL-12025R | HCC00 |
| 30 | 16 | KW250 | CRE20-CL-1630R | HCC00 |
| | 25 | KW250 | CRE20-CL-2530R | HCC00 |
| | 35 | KW250 | CRE20-CL-3530R | HCC00 |
| | 50 | KW250 | CRE20-CL-5030R | HCC00 |
| | 70 | KW250 | CRE20-CL-7030R | HCC00 |
| | 95 | KW250 | CRE20-CL-9530R | HCC00 |
| | 120 | KW250 | CRE20-CL-12030R | HCC00 |

### Equipment




### Necessary Tools




### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

- For perfect welding, clean and remove oxide and moisture from reinforcement steel and conductor before making connection
- Kumwell CRE Mold provides ceramic fiber to prevent leakage

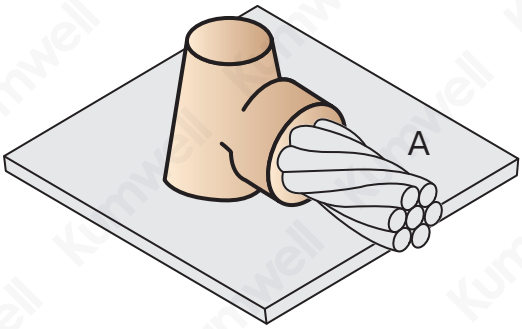
Note: Special requirement can be requested.

Kumwell

# CS1

## Cable to Steel

Horizontal cable to horizontal steel surface (off surface)




| Conductor Size A(mm²) | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|
| 10 | KW45 | CS1-A-10 | **HCA00 |
| 16 | KW45 | CS1-A-16 | **HCA00 |
| 25 | KW45 | CS1-A-25 | **HCA00 |
| 35 | KW45 | CS1-A-35 | **HCA00 |
| Ø8 mm | KW90 | CS1-C-8SC | HCC00 |
| 50 | KW90 | CS1-C-50 | HCC00 |
| Ø9.5 mm | KW90 | CS1-C-9.5SC | HCC00 |
| Ø10 mm | KW90 | CS1-C-10SC | HCC00 |
| 70 | KW90 | CS1-C-70 | HCC00 |
| 95 | KW115 | CS1-C-95 | HCC00 |
| 120 | KW115 | CS1-C-120 | HCC00 |
| 150 | KW150 | CS1-C-150 | HCC00 |
| 185 | KW200 | CS1-C-185 | HCC00 |
| 240 | KW200 | CS1-C-240 | HCC00 |
| 300 | KW250 | CS1-C-300 | HCC00 |

### Equipment


Mold


Metal powder


Handle clamp


Steel disk

### Necessary Tools


Mold brush


Cable clean brush


Busbar brush


Flint igniter


Scraper



Tool box

### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

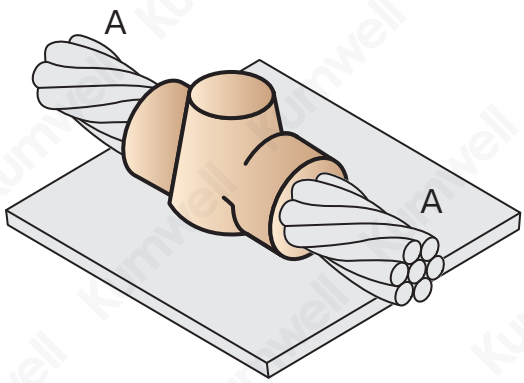
- SC means Solid Copper
- For perfect welding, between conductor and flat steel, making connection need to remove moisture, oxide and galvanized metal
- After welding process, coating steel's surface and connection by Rust-Oleum cold galvanizing is required
- "**HCA00" Handle clamp type A is completely assembled with the mold
- "Off surface" means that the cable is higher than steel surface

Note: Special requirement can be requested.

# CS2

## Cable to Steel

Horizontal thru cable to horizontal steel surface (off surface)




| Conductor Size A(mm²) | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|
| 10 | KW45 | CS2-A-10 | **HCA00 |
| 16 | KW45 | CS2-A-16 | **HCA00 |
| 25 | KW45 | CS2-A-25 | **HCA00 |
| 35 | KW45 | CS2-A-35 | **HCA00 |
| Ø8 mm | KW90 | CS2-C-8SC | HCC00 |
| 50 | KW90 | CS2-C-50 | HCC00 |
| Ø10 mm | KW115 | CS2-C-10SC | HCC00 |
| 70 | KW115 | CS2-C-70 | HCC00 |
| 95 | KW115 | CS2-C-95 | HCC00 |
| 120 | KW150 | CS2-C-120 | HCC00 |
| 150 | KW200 | CS2-C-150 | HCC00 |
| 185 | KW250 | CS2-C-185 | HCC00 |
| 240 | KW150x2 | CS2-D-240 | HCD00 |
| 300 | KW200x2 | CS2-D-300 | HCD00 |

### Equipment




### Necessary Tools




### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

- SC means Solid Copper
- For perfect welding, between conductor and flat steel, making connection need to remove moisture, oxide and galvanized metal
- After welding process, coating steel's surface and connection by Rust-Oleum cold galvanizing is required
- "**HCA00" Handle clamp type A is completely assembled with the mold
- "Off surface" means that the cable is higher than steel surface

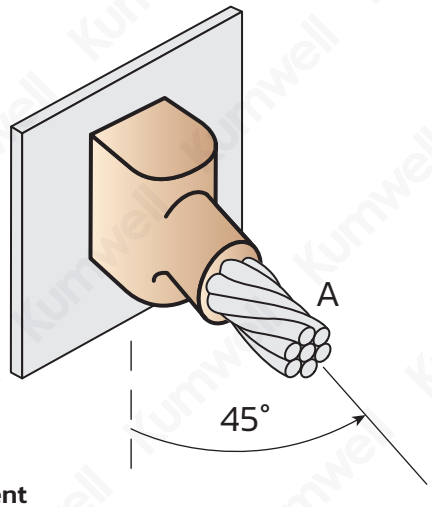
Note: Special requirement can be requested.

Kumwell

# CS3

## Cable to Steel

Angular cable drop to vertical steel surface




| Conductor Size A(mm²) | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|
| 10 | KW45 | CS3-C-10 | HCC00-Y |
| 16 | KW45 | CS3-C-16 | HCC00-Y |
| 25 | KW45 | CS3-C-25 | HCC00-Y |
| 35 | KW45 | CS3-C-35 | HCC00-Y |
| Ø8 mm | KW90 | CS3-C-8SC | HCC00-Y |
| 50 | KW90 | CS3-C-50 | HCC00-Y |
| Ø10 mm | KW115 | CS3-C-10SC | HCC00-Y |
| 70 | KW90 | CS3-C-70 | HCC00-Y |
| 95 | KW115 | CS3-C-95 | HCC00-Y |
| 120 | KW115 | CS3-C-120 | HCC00-Y |
| 150 | KW150 | CS3-C-150 | HCC00-Y |
| 185 | KW200 | CS3-C-185 | HCC00-Y |
| 240 | KW200 | CS3-C-240 | HCC00-Y |
| 300 | KW250 | CS3-C-300 | HCC00-Y |

### Equipment


Mold


Metal powder


Handle clamp


Steel disk

### Necessary Tools


Mold brush


Cable clean brush


Busbar brush


Flint igniter


Scraper



Tool box

### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

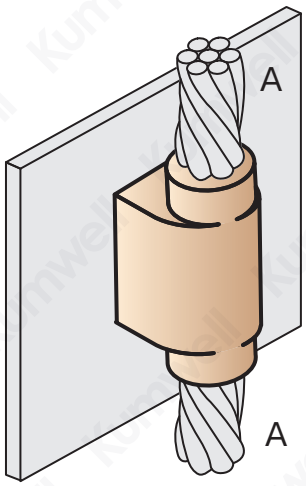
- SC means Solid Copper
- For perfect welding, clean and remove oxide and moisture from reinforcement steel and conductor before making connection
- After welding process, coating steel's surface and connection by Rust-Oleum cold galvanizing is required

Note: Special requirement can be requested.

# CS4

## Cable to Steel

Vertical thru cable to vertical steel surface (off surface)




| Conductor Size A(mm²) | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|
| 25 | KW90 | CS4-C-25 | HCC00-Y |
| 35 | KW115 | CS4-CR-35 | HCC00-Y |
| 50 | KW200 | CS4-CR-50 | HCC00-Y |
| 70 | KW200 | CS4-CR-70 | HCC00-Y |
| 95 | KW250 | CS4-CR-95 | HCC00-Y |
| 120 | KW250 | CS4-CR-120 | HCC00-Y |
| 150 | KW250 | CS4-CR-150 | HCC00-Y |
| 185 | KW150x2 | CS4-DR-185 | HCD00-Y |
| 240 | KW200x2 | CS4-DR-240 | HCD00-Y |
| 300 | KW250x2 | CS4-DR-300 | HCD00-Y |

### Equipment


Mold


Metal powder


Handle clamp


Steel disk

### Necessary Tools


Mold brush


Cable clean brush


Busbar brush


Flint igniter


Scraper



Tool box

### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

- For perfect welding, between conductor and flat steel, making connection need to remove moisture, oxide and galvanized metal
- After welding process, coating steel's surface and connection by Rust-Oleum cold galvanizing is required
- "HCA00" Type A-Handle clamp is builted-in graphite mold
- "Off surface" means that the cable is higher than steel surface

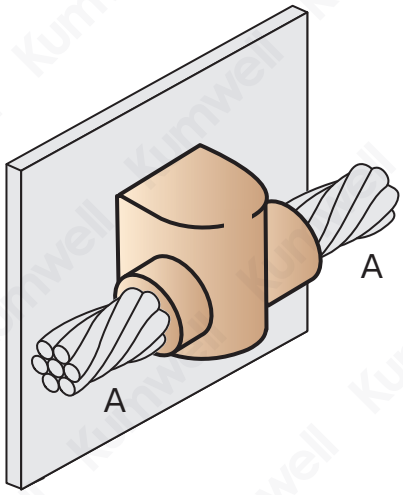
Note: Special requirement can be requested.

Kumwell

# CS6

## Cable to Steel

Horizontal thru cable to vertical steel surface (off surface)




| Conductor Size A(mm²) | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|
| 25 | KW65 | CS6-C-25 | HCC00-W |
| 35 | KW65 | CS6-C-35 | HCC00-W |
| 50 | KW115 | CS6-C-50 | HCC00-W |
| 70 | KW115 | CS6-C-70 | HCC00-W |
| 95 | KW150 | CS6-C-95 | HCC00-W |
| 120 | KW150 | CS6-C-120 | HCC00-W |
| 150 | KW250 | CS6-C-150 | HCC00-W |
| 185 | KW150x2 | CS6-DR-185 | HCD00-W |
| 240 | KW200x2 | CS6-DR-240 | HCD00-W |
| 300 | KW250x2 | CS6-DR-300 | HCD00-W |

### Equipment


Mold


Metal powder


Handle clamp


Steel disk

### Necessary Tools


Mold brush


Cable clean brush


Busbar brush


Flint igniter


Scraper



Tool box

### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

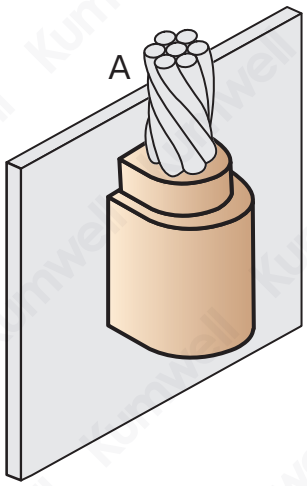
- SC means Solid Copper
- For perfect welding, between conductor and flat steel, making connection need to remove moisture, oxide and galvanized metal
- After welding process, coating steel's surface and connection by Rust-Oleum cold galvanizing is required
- "Off surface" means that the cable is higher than steel surface

Note: Special requirement can be requested.

# CS7

## Cable to Steel

Overhead vertical tap cable to vertical steel surface (on surface)




| Conductor Size A(mm²) | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|
| 10 | KW65 | CS7-C-10 | HCC00-Y |
| 16 | KW65 | CS7-C-16 | HCC00-Y |
| 25 | KW65 | CS7-C-25 | HCC00-Y |
| 35 | KW65 | CS7-C-35 | HCC00-Y |
| Ø8 mm | KW90 | CS7-C-8SC | HCC00-Y |
| 50 | KW90 | CS7-C-50 | HCC00-Y |
| Ø10 mm | KW150 | CS7-CR-10SC | HCC00-Y |
| 70 | KW150 | CS7-CR-70 | HCC00-Y |
| 95 | KW150 | CS7-CR-95 | HCC00-Y |
| 120 | KW200 | CS7-CR-120 | HCC00-Y |
| 150 | KW250 | CS7-CR-150 | HCC00-Y |
| 185 | KW150x2 | CS7-DR-185 | HCD00-Y |
| 240 | KW200x2 | CS7-DR-240 | HCD00-Y |
| 300 | KW250x2 | CS7-DR-300 | HCD00-Y |

### Equipment


Mold


Metal powder


Handle clamp


Steel disk

### Necessary Tools


Mold brush


Cable clean brush


Busbar brush


Flint igniter


Scraper



Tool box

### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

- SC means Solid Copper
- For perfect welding, between conductor and flat steel, making connection need to remove moisture, oxide and galvanized metal
- After welding process, coating steel's surface and connection by Rust-Oleum cold galvanizing is required
- "On surface" means that the cable is closed to steel surface

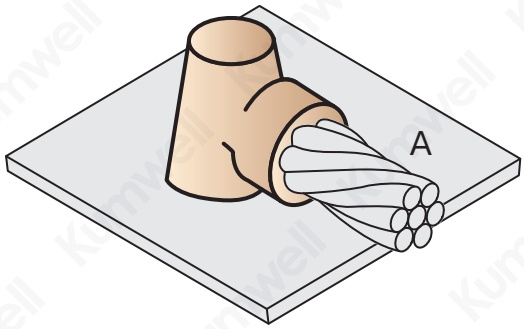
Note: Special requirement can be requested.

Kumwell

# CS8

## Cable to Steel

Horizontal cable to horizontal steel surface (on surface)




| Conductor Size A(mm²) | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|
| 10 | KW45 | CS8-A-10 | **HCA00 |
| 16 | KW45 | CS8-A-16 | **HCA00 |
| 25 | KW45 | CS8-A-25 | **HCA00 |
| 35 | KW45 | CS8-A-35 | **HCA00 |
| Ø8 mm | KW45 | CS8-A-8SC | **HCA00 |
| 50 | KW65 | CS8-A-50 | **HCA00 |
| Ø10 mm | KW65 | CS8-A-10SC | **HCA00 |
| 70 | KW90 | CS8-C-70 | HCC00 |
| 95 | KW115 | CS8-C-95 | HCC00 |
| 120 | KW115 | CS8-C-120 | HCC00 |
| 150 | KW150 | CS8-C-150 | HCC00 |
| 185 | KW200 | CS8-C-185 | HCC00 |
| 240 | KW200 | CS8-C-240 | HCC00 |
| 300 | KW250 | CS8-C-300 | HCC00 |

### Equipment




### Necessary Tools




### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

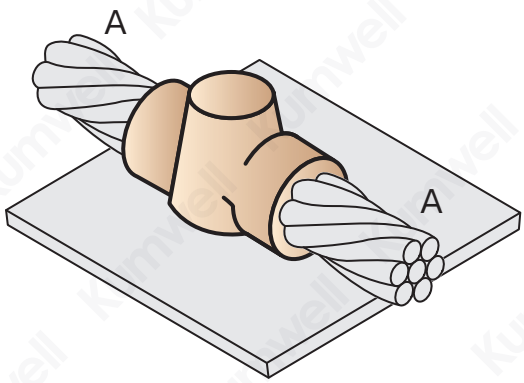
- SC means Solid Copper
- For perfect welding, between conductor and flat steel, making connection need to remove moisture, oxide and galvanized metal
- After welding process, coating steel's surface and connection by Rust-Oleum cold galvanizing is required
- "**HCA00" Handle clamp type A is completely assembled with the mold
- "On surface" means that the cable is closed to steel surface

Note: Special requirement can be requested.

# CS9

## Cable to Steel

Horizontal thru cable to horizontal steel surface (on surface)




| Conductor Size A(mm²) | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|
| 10 | KW45 | CS9-A-10 | **HCA00 |
| 16 | KW45 | CS9-A-16 | **HCA00 |
| 25 | KW45 | CS9-A-25 | **HCA00 |
| 35 | KW45 | CS9-A-35 | **HCA00 |
| Ø8 mm | KW90 | CS9-C-8SC | HCC00 |
| 50 | KW90 | CS9-C-50 | HCC00 |
| Ø10 mm | KW115 | CS9-C-10SC | HCC00 |
| 70 | KW115 | CS9-C-70 | HCC00 |
| 95 | KW115 | CS9-C-95 | HCC00 |
| 120 | KW150 | CS9-C-120 | HCC00 |
| 150 | KW200 | CS9-C-150 | HCC00 |
| 185 | KW250 | CS9-C-185 | HCC00 |
| 240 | KW150x2 | CS9-D-240 | HCD00 |
| 300 | KW200x2 | CS9-D-300 | HCD00 |

### Equipment




### Necessary Tools




### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

- SC means Solid Copper
- For perfect welding, between conductor and flat steel, making connection need to remove moisture, oxide and galvanized metal
- After welding process, coating steel's surface and connection by Rust-Oleum cold galvanizing is required
- "**HCA00" Handle clamp type A is completely assembled with the mold
- "On surface" means that the cable is closed to steel surface

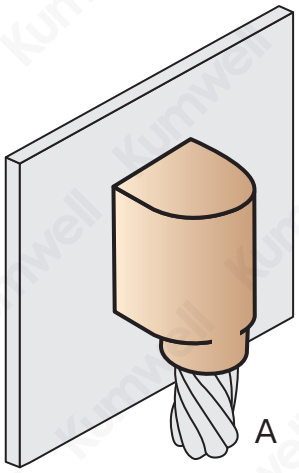
Note: Special requirement can be requested.

Kumwell

# CS23

## Cable to Steel

Vertical cable down to vertical steel surface (off surface)




| Conductor Size A(mm²) | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|
| 25 | KW65 | CS23-C-25 | HCC00-Y |
| 35 | KW65 | CS23-C-35 | HCC00-Y |
| 50 | KW115 | CS23-C-50 | HCC00-Y |
| 70 | KW115 | CS23-C-70 | HCC00-Y |
| 95 | KW150 | CS23-C-95 | HCC00-Y |
| 120 | KW200 | CS23-C-120 | HCC00-Y |
| 150 | KW200 | CS23-C-150 | HCC00-Y |
| 185 | KW250 | CS23-C-185 | HCC00-Y |
| 240 | KW150x2 | CS23-CR-240 | HCC00-Y |
| 300 | KW200x2 | CS23-DR-300 | HCD00-Y |

### Equipment


Mold


Metal powder


Handle clamp


Steel disk

### Necessary Tools


Mold brush


Cable clean brush


Busbar brush


Flint igniter


Scraper



Tool box

### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

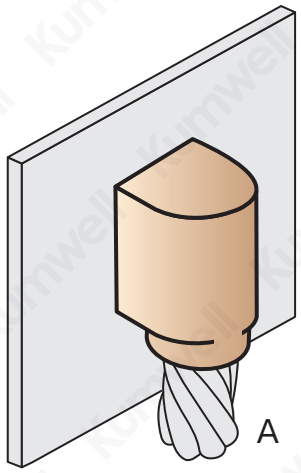
- For perfect welding, between conductor and flat steel, making connection need to remove moisture, oxide and galvanized metal
- After welding process, coating steel's surface and connection by Rust-Oleum cold galvanizing is required
- "Off surface" means that the cable is higher than steel surface

Note: Special requirement can be requested.

# CS25

## Cable to Steel

Vertical cable drop to vertical steel surface (on surface)




| Conductor Size A(mm²) | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|
| 10 | KW45 | CS25-C-10 | HCC00-Y |
| 16 | KW45 | CS25-C-16 | HCC00-Y |
| 25 | KW45 | CS25-C-25 | HCC00-Y |
| 35 | KW45 | CS25-C-35 | HCC00-Y |
| 50 | KW65 | CS25-C-50 | HCC00-Y |
| 70 | KW90 | CS25-C-70 | HCC00-Y |
| 95 | KW115 | CS25-C-95 | HCC00-Y |
| 120 | KW115 | CS25-C-120 | HCC00-Y |
| 150 | KW150 | CS25-C-150 | HCC00-Y |
| 185 | KW200 | CS25-CR-185 | HCC00-Y |
| 240 | KW200 | CS25-CR-240 | HCC00-Y |
| 300 | KW250 | CS25-CR-300 | HCC00-Y |

### Equipment



Mold | Metal powder



Handle clamp | Steel disk

### Necessary Tools



Mold brush | Cable clean brush | Busbar brush




Flint igniter | Scraper | Tool box

### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

- For perfect welding, between conductor and flat steel, making connection need to remove moisture, oxide and galvanized metal
- After welding process, coating steel's surface and connection by Rust-Oleum cold galvanizing is required
- "On surface" means that the cable is closed to steel surface

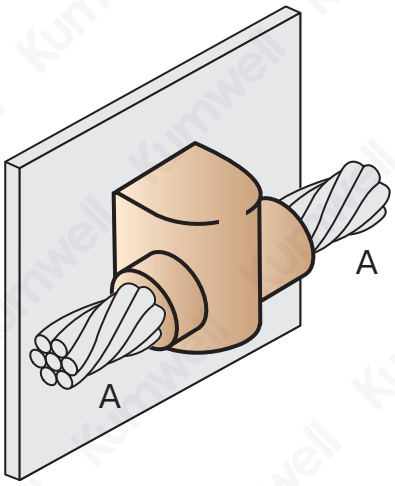
Note: Special requirement can be requested.

Kumwell

# CS27

## Cable to Steel

Horizontal thru cable to vertical steel surface (on surface)




| Conductor Size A(mm²) | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|
| 10 | KW45 | CS27-C-10 | HCC00-Y |
| 16 | KW45 | CS27-C-16 | HCC00-Y |
| 25 | KW45 | CS27-C-25 | HCC00-Y |
| 35 | KW45 | CS27-C-35 | HCC00-Y |
| Ø8 mm | KW65 | CS27-C-8SC | HCC00-Y |
| 50 | KW115 | CS27-C-50 | HCC00-Y |
| Ø10 mm | KW115 | CS27-C-10SC | HCC00-Y |
| 70 | KW115 | CS27-C-70 | HCC00-Y |
| 95 | KW150 | CS27-C-95 | HCC00-Y |
| 120 | KW150 | CS27-C-120 | HCC00-Y |
| 150 | KW200 | CS27-CR-150 | HCC00-Y |
| 185 | KW250 | CS27-CR-185 | HCC00-Y |
| 240 | KW150x2 | CS27-D-240 | HCD00-Y |
| 300 | KW200x2 | CS27-D-300 | HCD00-Y |

### Equipment


Mold


Metal powder


Handle clamp


Steel disk

### Necessary Tools


Mold brush


Cable clean brush


Busbar brush


Flint igniter


Scraper



Tool box

### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

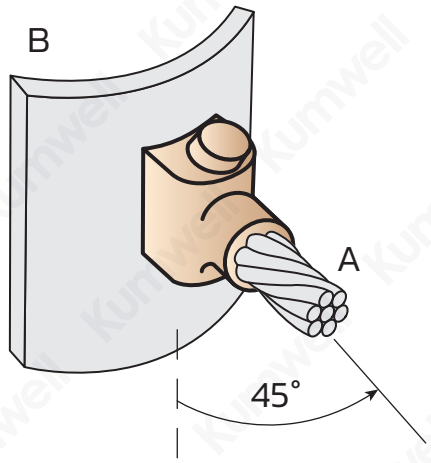
- For perfect welding, between conductor and flat steel, making connection need to remove moisture, oxide and galvanized metal
- After welding process, coating steel's surface and connection by Rust-Oleum cold galvanizing is required
- "On surface" means that the cable is closed to steel surface

Note: Special requirement can be requested.

# CP1

## Cable to Pipe

Angular cable drop to vertical pipe




### Equipment




### Necessary Tools




### Recommended Tools

- Butane torch
- Butane gas
- Gloves

| Conductor Size A(mm²) | Conductor Size B(Inch) | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|---|
| 10 | 2 | KW45 | CP1-C-102D | HCC00-X |
| | 2.5 | KW45 | CP1-C-102.5D | HCC00-X |
| | 3 | KW45 | CP1-C-103D | HCC00-X |
| | 4 | KW45 | CP1-C-104D | HCC00-X |
| | 5 | KW45 | CP1-C-105D | HCC00-X |
| | 6 | KW45 | CP1-C-106D | HCC00-X |
| 16 | 2 | KW45 | CP1-C-162D | HCC00-X |
| | 2.5 | KW45 | CP1-C-162.5D | HCC00-X |
| | 3 | KW45 | CP1-C-163D | HCC00-X |
| | 4 | KW45 | CP1-C-164D | HCC00-X |
| | 5 | KW45 | CP1-C-165D | HCC00-X |
| | 6 | KW45 | CP1-C-166D | HCC00-X |
| 25 | 2 | KW45 | CP1-C-252D | HCC00-X |
| | 2.5 | KW45 | CP1-C-252.5D | HCC00-X |
| | 3 | KW45 | CP1-C-253D | HCC00-X |
| | 4 | KW45 | CP1-C-254D | HCC00-X |
| | 5 | KW45 | CP1-C-255D | HCC00-X |
| | 6 | KW45 | CP1-C-256D | HCC00-X |
| 35 | 2 | KW45 | CP1-C-352D | HCC00-X |
| | 2.5 | KW45 | CP1-C-352.5D | HCC00-X |
| | 3 | KW45 | CP1-C-353D | HCC00-X |
| | 4 | KW45 | CP1-C-354D | HCC00-X |
| | 5 | KW45 | CP1-C-355D | HCC00-X |
| | 6 | KW45 | CP1-C-356D | HCC00-X |
| Ø8 mm | 2 | KW90 | CP1-C-8SC2D | HCC00-X |
| | 2.5 | KW90 | CP1-C-8SC2.5D | HCC00-X |
| | 3 | KW90 | CP1-C-8SC3D | HCC00-X |
| | 4 | KW90 | CP1-C-8SC4D | HCC00-X |
| | 5 | KW90 | CP1-C-8SC5D | HCC00-X |
| | 6 | KW90 | CP1-C-8SC6D | HCC00-X |
| 50 | 2 | KW90 | CP1-C-502D | HCC00-X |
| | 2.5 | KW90 | CP1-C-502.5D | HCC00-X |
| | 3 | KW90 | CP1-C-503D | HCC00-X |
| | 4 | KW90 | CP1-C-504D | HCC00-X |
| | 5 | KW90 | CP1-C-505D | HCC00-X |
| | 6 | KW90 | CP1-C-506D | HCC00-X |
| Ø10 mm | 2 | KW115 | CP1-C-10SC2D | HCC00-X |
| | 2.5 | KW115 | CP1-C-10SC2.5D | HCC00-X |
| | 3 | KW115 | CP1-C-10SC3D | HCC00-X |
| | 4 | KW115 | CP1-C-10SC4D | HCC00-X |
| | 5 | KW115 | CP1-C-10SC5D | HCC00-X |
| | 6 | KW115 | CP1-C-10SC6D | HCC00-X |
| 70 | 2 | KW90 | CP1-C-702D | HCC00-X |
| | 2.5 | KW90 | CP1-C-702.5D | HCC00-X |
| | 3 | KW90 | CP1-C-703D | HCC00-X |
| | 4 | KW90 | CP1-C-704D | HCC00-X |
| | 5 | KW90 | CP1-C-705D | HCC00-X |
| | 6 | KW90 | CP1-C-706D | HCC00-X |

### Note

- Pipe diameter must be inform
- SC means Solid Copper
- For perfect welding, clean and remove oxide and moisture from reinforcement steel and conductor before making connection
- After welding process, coating steel's surface and connection by Rust-Oleum cold galvanizing is required

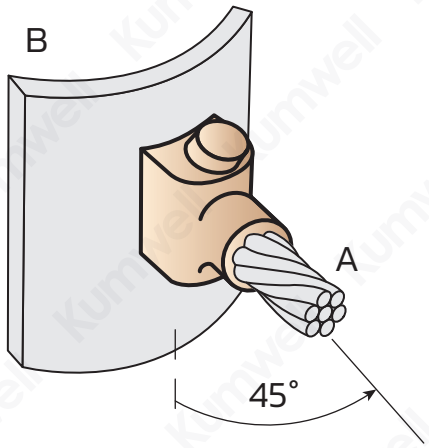
Note: Special requirement can be requested.

Kumwell

# CP1

## Cable to Pipe

Angular cable drop to vertical pipe




| Conductor Size A(mm²) | Conductor Size B(Inch) | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|---|
| 95 | 2 | KW115 | CP1-C-952D | HCC00-X |
| | 2.5 | KW115 | CP1-C-952.5D | HCC00-X |
| | 3 | KW115 | CP1-C-953D | HCC00-X |
| | 4 | KW115 | CP1-C-954D | HCC00-X |
| | 5 | KW115 | CP1-C-955D | HCC00-X |
| | 6 | KW115 | CP1-C-956D | HCC00-X |
| 120 | 2 | KW115 | CP1-C-1202D | HCC00-X |
| | 2.5 | KW115 | CP1-C-1202.5D | HCC00-X |
| | 3 | KW115 | CP1-C-1203D | HCC00-X |
| | 4 | KW115 | CP1-C-1204D | HCC00-X |
| | 5 | KW115 | CP1-C-1205D | HCC00-X |
| | 6 | KW115 | CP1-C-1206D | HCC00-X |
| 150 | 2 | KW150 | CP1-C-1502D | HCC00-X |
| | 2.5 | KW150 | CP1-C-1502.5D | HCC00-X |
| | 3 | KW150 | CP1-C-1503D | HCC00-X |
| | 4 | KW150 | CP1-C-1504D | HCC00-X |
| | 5 | KW150 | CP1-C-1505D | HCC00-X |
| | 6 | KW150 | CP1-C-1506D | HCC00-X |
| 185 | 2 | KW200 | CP1-C-1852D | HCC00-X |
| | 2.5 | KW200 | CP1-C-1852.5D | HCC00-X |
| | 3 | KW200 | CP1-C-1853D | HCC00-X |
| | 4 | KW200 | CP1-C-1854D | HCC00-X |
| | 5 | KW200 | CP1-C-1855D | HCC00-X |
| | 6 | KW200 | CP1-C-1856D | HCC00-X |
| 240 | 2 | KW200 | CP1-C-2402D | HCC00-X |
| | 2.5 | KW200 | CP1-C-2402.5D | HCC00-X |
| | 3 | KW200 | CP1-C-2403D | HCC00-X |
| | 4 | KW200 | CP1-C-2404D | HCC00-X |
| | 5 | KW200 | CP1-C-2405D | HCC00-X |
| | 6 | KW200 | CP1-C-2406D | HCC00-X |
| 300 | 2 | KW250 | CP1-C-3002D | HCC00-X |
| | 2.5 | KW250 | CP1-C-3002.5D | HCC00-X |
| | 3 | KW250 | CP1-C-3003D | HCC00-X |
| | 4 | KW250 | CP1-C-3004D | HCC00-X |
| | 5 | KW250 | CP1-C-3005D | HCC00-X |
| | 6 | KW250 | CP1-C-3006D | HCC00-X |

### Equipment


Mold


Metal powder


Handle clamp


Steel disk

### Necessary Tools


Mold brush


Cable clean brush


Busbar brush


Flint igniter


Scraper



Tool box

### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

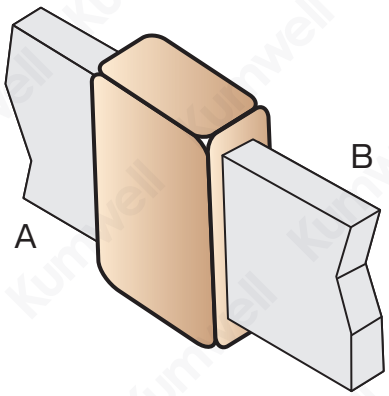
- Pipe diameter must be inform
- SC means Solid Copper
- For perfect welding, clean and remove oxide and moisture from reinforcement steel and conductor before making connection
- After welding process, coating steel's surface and connection by Rust-Oleum cold galvanizing is required

Note: Special requirement can be requested.

# BB1

## Busbar to Busbar

Horizontal busbar end to end (vertical flat side)




| Conductor Size | | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|---|
| A(mm.xmm.) | B(mm.xmm.) | | | |
| 20x2 | 20x2 | KW45 | BB1-C-202 | HCC00 |
| 20x3 | 20x3 | KW45 | BB1-C-203 | HCC00 |
| 20x4 | 20x4 | KW65 | BB1-C-204 | HCC00 |
| 20x5 | 20x5 | KW90 | BB1-C-205 | HCC00 |
| 25x2 | 25x2 | KW65 | BB1-C-252 | HCC00 |
| 25x3 | 25x3 | KW65 | BB1-C-253 | HCC00 |
| 25x4 | 25x4 | KW90 | BB1-C-254 | HCC00 |
| 25x5 | 25x5 | KW90 | BB1-C-255 | HCC00 |
| 25x6 | 25x6 | KW115 | BB1-C-256 | HCC00 |
| 25x8 | 25x8 | KW150 | BB1-C-258 | HCC00 |
| 25x12 | 25x12 | KW200 | BB1-C-2512 | HCC00 |
| 30x2 | 30x2 | KW65 | BB1-C-302 | HCC00 |
| 30x3 | 30x3 | KW65 | BB1-C-303 | HCC00 |
| 30x4 | 30x4 | KW115 | BB1-C-304 | HCC00 |
| 30x5 | 30x5 | KW115 | BB1-C-305 | HCC00 |
| 30x6 | 30x6 | KW150 | BB1-C-306 | HCC00 |
| 31x3 | 31x3 | KW65 | BB1-C-313 | HCC00 |
| 31x6 | 31x6 | KW115 | BB1-C-316 | HCC00 |
| 38x3 | 38x3 | KW150 | BB1-C-383 | HCC00 |
| 38x5 | 38x5 | KW150 | BB1-C-385 | HCC00 |
| 38x6 | 38x6 | KW200 | BB1-C-386 | HCC00 |
| 38x8 | 38x8 | KW200 | BB1-C-388 | HCC00 |
| 40x3 | 40x3 | KW115 | BB1-C-403 | HCC00 |
| 40x4 | 40x4 | KW150 | BB1-C-404 | HCC00 |
| 40x5 | 40x5 | KW150 | BB1-C-405 | HCC00 |
| 40x6 | 40x6 | KW200 | BB1-C-406 | HCC00 |
| 50x3 | 50x3 | KW90 | BB1-C-503 | HCC00 |
| 50x4 | 50x4 | KW115 | BB1-C-504 | HCC00 |
| 50x5 | 50x5 | KW200 | BB1-C-505 | HCC00 |
| 50x6 | 50x6 | KW250 | BB1-C-506 | HCC00 |
| 50x8 | 50x8 | KW150x2 | BB1-D-508 | HCD00 |
| 50x10 | 50x10 | KW200x2 | BB1-D-5010 | HCD00 |
| 60x6 | 60x6 | KW200x2 | BB1-D-606 | HCD00 |
| 60x8 | 60x8 | KW200x2 | BB1-D-608 | HCD00 |
| 60x10 | 60x10 | KW250x2 | BB1-D-6010 | HCD00 |
| 80x6 | 80x6 | KW200x2 | BB1-D-806 | HCD00 |
| 80x8 | 80x8 | KW250x2 | BB1-D-808 | HCD00 |
| 80x10 | 80x10 | KW200x3 | BB1-D-8010 | HCD00 |

### Equipment




### Necessary Tools




### Recommended Tools

- Butane torch
- Butane gas
- Gloves

Note: Special requirement can be requested.

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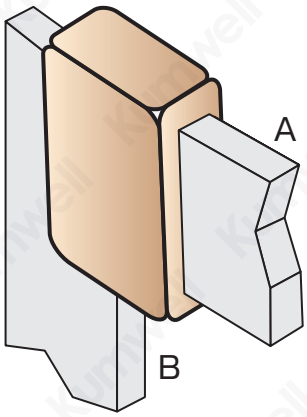
# BB2

## Busbar to Busbar

Horizontal busbar tap to vertical bus bar down




### Equipment




### Necessary Tools




### Recommended Tools

- Butane torch
- Butane gas
- Gloves

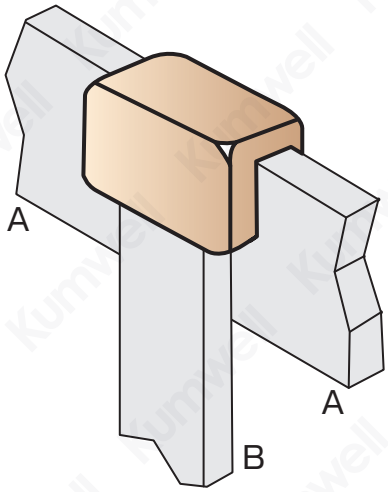
| Conductor Size | | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|---|
| A(mm.xmm.) | B(mm.xmm.) | | | |
| 20x2 | 20x2 | KW45 | BB2-C-202 | HCC00 |
| 20x3 | 20x3 | KW45 | BB2-C-203 | HCC00 |
| 20x4 | 20x4 | KW65 | BB2-C-204 | HCC00 |
| 20x5 | 20x5 | KW90 | BB2-C-205 | HCC00 |
| 25x2 | 25x2 | KW45 | BB2-C-252 | HCC00 |
| 25x3 | 25x3 | KW65 | BB2-C-253 | HCC00 |
| 25x4 | 25x4 | KW90 | BB2-C-254 | HCC00 |
| 25x5 | 25x5 | KW90 | BB2-C-255 | HCC00 |
| 25x6 | 25x6 | KW115 | BB2-C-256 | HCC00 |
| 25x8 | 25x8 | KW150 | BB2-C-258 | HCC00 |
| 25x12 | 25x12 | KW250 | BB2-C-2512 | HCC00 |
| 30x2 | 30x2 | KW65 | BB2-C-302 | HCC00 |
| 30x3 | 30x3 | KW65 | BB2-C-303 | HCC00 |
| 30x4 | 30x4 | KW90 | BB2-C-304 | HCC00 |
| 30x5 | 30x5 | KW115 | BB2-C-305 | HCC00 |
| 30x6 | 30x6 | KW150 | BB2-C-306 | HCC00 |
| 31x3 | 31x3 | KW65 | BB2-C-313 | HCC00 |
| 31x6 | 31x6 | KW150 | BB2-C-316 | HCC00 |
| 38x3 | 38x3 | KW115 | BB2-C-383 | HCC00 |
| 38x5 | 38x5 | KW115 | BB2-C-385 | HCC00 |
| 38x6 | 38x6 | KW200 | BB2-C-386 | HCC00 |
| 38x8 | 38x8 | KW250 | BB2-C-388 | HCC00 |
| 40x3 | 40x3 | KW90 | BB2-C-403 | HCC00 |
| 40x4 | 40x4 | KW115 | BB2-C-404 | HCC00 |
| 40x5 | 40x5 | KW150 | BB2-C-405 | HCC00 |
| 40x6 | 40x6 | KW200 | BB2-C-406 | HCC00 |
| 50x3 | 50x3 | KW90 | BB2-C-503 | HCC00 |
| 50x4 | 50x4 | KW115 | BB2-C-504 | HCC00 |
| 50x5 | 50x5 | KW200 | BB2-C-505 | HCC00 |
| 50x6 | 50x6 | KW250 | BB2-C-506 | HCC00 |
| 50x8 | 50x8 | KW150x2 | BB2-D-508 | HCD00 |
| 50x10 | 50x10 | KW200x2 | BB2-D-5010 | HCD00 |
| 60x6 | 60x6 | KW150x2 | BB2-D-606 | HCD00 |
| 60x8 | 60x8 | KW200x2 | BB2-D-608 | HCD00 |
| 60x10 | 60x10 | KW250x2 | BB2-D-6010 | HCD00 |
| 80x6 | 80x6 | KW150x2 | BB2-D-806 | HCD00 |
| 80x8 | 80x8 | KW200x2 | BB2-D-808 | HCD00 |
| 80x10 | 80x10 | KW250x2 | BB2-D-8010 | HCD00 |

Note: Special requirement can be requested.

# BB3

## Busbar to Busbar

Vertical busbar drop tap to horizontal bus run




### Equipment




### Necessary Tools




### Recommended Tools

- Butane torch
- Butane gas
- Gloves

| Conductor Size | | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|---|
| A(mm.xmm.) | B(mm.xmm.) | | | |
| 20x2 | 20x2 | KW45 | BB3-C-202202 | HCC00 |
| 20x3 | 20x3 | KW65 | BB3-C-203203 | HCC00 |
| 20x4 | 20x4 | KW65 | BB3-C-204204 | HCC00 |
| 20x5 | 20x5 | KW65 | BB3-C-205205 | HCC00 |
| 25x2 | 25x2 | KW65 | BB3-C-252252 | HCC00 |
| 25x3 | 25x3 | KW65 | BB3-C-253253 | HCC00 |
| 25x4 | 25x4 | KW90 | BB3-C-254254 | HCC00 |
| 25x5 | 25x5 | KW115 | BB3-C-255255 | HCC00 |
| 25x6 | 25x6 | KW150 | BB3-C-256256 | HCC00 |
| 25x8 | 25x8 | KW250 | BB3-C-258258 | HCC00 |
| 25x12 | 25x12 | KW150x2 | BB3-C-25122512 | HCC00 |
| 30x2 | 30x2 | KW65 | BB3-C-302302 | HCC00 |
| 30x3 | 30x3 | KW90 | BB3-C-303303 | HCC00 |
| 30x4 | 30x4 | KW115 | BB3-C-304304 | HCC00 |
| 30x5 | 30x5 | KW150 | BB3-C-305305 | HCC00 |
| 30x6 | 30x6 | KW200 | BB3-C-306306 | HCC00 |
| 31x3 | 31x3 | KW115 | BB3-C-313313 | HCC00 |
| 31x6 | 31x6 | KW200 | BB3-C-316316 | HCC00 |
| 38x3 | 38x3 | KW115 | BB3-C-383383 | HCC00 |
| 38x5 | 38x5 | KW150 | BB3-C-385385 | HCC00 |
| 38x6 | 38x6 | KW200 | BB3-C-386386 | HCC00 |
| 38x8 | 38x8 | KW250 | BB3-C-388388 | HCC00 |
| 40x3 | 40x3 | KW115 | BB3-C-403403 | HCC00 |
| 40x4 | 40x4 | KW150 | BB3-C-404404 | HCC00 |
| 40x5 | 40x5 | KW150 | BB3-C-405405 | HCC00 |
| 40x6 | 40x6 | KW200 | BB3-C-406406 | HCC00 |
| 50x3 | 50x3 | KW200 | BB3-C-503503 | HCC00 |
| 50x4 | 50x4 | KW200 | BB3-C-504504 | HCC00 |
| 50x5 | 50x5 | KW200 | BB3-C-505505 | HCC00 |
| 50x6 | 50x6 | KW250 | BB3-C-506506 | HCC00 |
| 50x8 | 50x8 | KW150x2 | BB3-D-508508 | HCD00 |
| 50x10 | 50x10 | KW250x2 | BB3-D-50105010 | HCD00 |
| 60x6 | 60x6 | KW150x2 | BB3-D-606606 | HCD00 |
| 60x8 | 60x8 | KW200x2 | BB3-D-608608 | HCD00 |
| 60x10 | 60x10 | KW250x2 | BB3-D-60106010 | HCD00 |
| 80x6 | 80x6 | KW200x2 | BB3-D-806806 | HCD00 |
| 80x8 | 80x8 | KW250x2 | BB3-D-808808 | HCD00 |
| 80x10 | 80x10 | KW200x3 | BB3-D-80108010 | HCD00 |

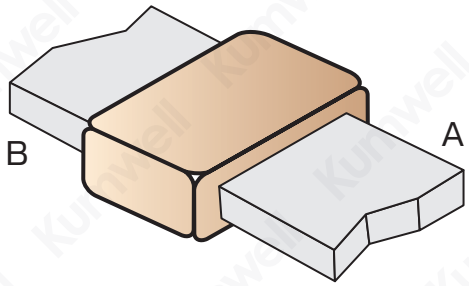
Note: Special requirement can be requested.

Kumwell

# BB7

## Busbar to Busbar

Horizontal flat busbar end to end




| Conductor Size | | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|---|
| A(mm.xmm.) | B(mm.xmm.) | | | |
| 20x2 | 20x2 | KW45 | BB7-C-202 | HCC00 |
| 20x3 | 20x3 | KW45 | BB7-C-203 | HCC00 |
| 20x4 | 20x4 | KW65 | BB7-C-204 | HCC00 |
| 20x5 | 20x5 | KW90 | BB7-C-205 | HCC00 |
| 25x2 | 25x2 | KW45 | BB7-C-252 | HCC00 |
| 25x3 | 25x3 | KW65 | BB7-C-253 | HCC00 |
| 25x4 | 25x4 | KW90 | BB7-C-254 | HCC00 |
| 25x5 | 25x5 | KW90 | BB7-C-255 | HCC00 |
| 25x6 | 25x6 | KW115 | BB7-C-256 | HCC00 |
| 25x8 | 25x8 | KW150 | BB7-C-258 | HCC00 |
| 25x12 | 25x12 | KW200 | BB7-C-2512 | HCC00 |
| 30x2 | 30x2 | KW65 | BB7-C-302 | HCC00 |
| 30x3 | 30x3 | KW65 | BB7-C-303 | HCC00 |
| 30x4 | 30x4 | KW90 | BB7-C-304 | HCC00 |
| 30x5 | 30x5 | KW115 | BB7-C-305 | HCC00 |
| 30x6 | 30x6 | KW150 | BB7-C-306 | HCC00 |
| 31x3 | 31x3 | KW65 | BB7-C-313 | HCC00 |
| 31x6 | 31x6 | KW150 | BB7-C-316 | HCC00 |
| 38x3 | 38x3 | KW90 | BB7-C-383 | HCC00 |
| 38x5 | 38x5 | KW150 | BB7-C-385 | HCC00 |
| 38x6 | 38x6 | KW200 | BB7-C-386 | HCC00 |
| 38x8 | 38x8 | KW250 | BB7-C-388 | HCC00 |
| 40x3 | 40x3 | KW90 | BB7-C-403 | HCC00 |
| 40x4 | 40x4 | KW115 | BB7-C-404 | HCC00 |
| 40x5 | 40x5 | KW150 | BB7-C-405 | HCC00 |
| 40x6 | 40x6 | KW200 | BB7-C-406 | HCC00 |
| 50x3 | 50x3 | KW150 | BB7-D-503 | HCD00 |
| 50x4 | 50x4 | KW200 | BB7-D-504 | HCD00 |
| 50x5 | 50x5 | KW200 | BB7-D-505 | HCD00 |
| 50x6 | 50x6 | KW250 | BB7-D-506 | HCD00 |
| 50x8 | 50x8 | KW150x2 | BB7-D-508 | HCD00 |
| 50x10 | 50x10 | KW200x2 | BB7-D-5010 | HCD00 |
| 60x6 | 60x6 | KW150x2 | BB7-D-606 | HCD00 |
| 60x8 | 60x8 | KW200x2 | BB7-D-608 | HCD00 |
| 60x10 | 60x10 | KW250x2 | BB7-D-6010 | HCD00 |
| 80x6 | 80x6 | KW200x2 | BB7-D-806 | HCD00 |
| 80x8 | 80x8 | KW250x2 | BB7-D-808 | HCD00 |
| 80x10 | 80x10 | KW200x3 | BB7-D-8010 | HCD00 |

### Equipment




### Necessary Tools




### Recommended Tools

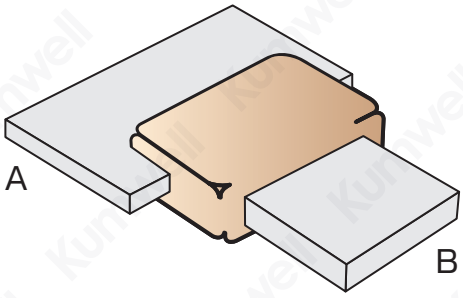
- Butane torch
- Butane gas
- Gloves

Note: Special requirement can be requested.

# BB14

## Busbar to Busbar

Horizontal flat busbar run and tap




### Equipment




### Necessary Tools




### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

- "*" means to meet UL Listed

| Conductor Size | | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|---|
| A(mm.xmm.) | B(mm.xmm.) | | | |
| 20x2 | 20x2 | KW45 | *BB14-C-202202 | HCC00 |
| 20x3 | 20x3 | KW45 | *BB14-C-203203 | HCC00 |
| 20x4 | 20x4 | KW65 | *BB14-C-204204 | HCC00 |
| 20x5 | 20x5 | KW90 | *BB14-C-205205 | HCC00 |
| 25x2 | 25x2 | KW45 | *BB14-C-252252 | HCC00 |
| 25x3 | 25x3 | KW65 | *BB14-C-253253 | HCC00 |
| 25x4 | 25x4 | KW90 | *BB14-C-254254 | HCC00 |
| 25x5 | 25x5 | KW90 | *BB14-C-255255 | HCC00 |
| 25x6 | 25x2 | KW115 | *BB14-C-256256 | HCC00 |
| 25x6 | 25x6 | KW90 | *BB14-C-256252 | HCC00 |
| 25x6 | 50x6 | KW250 | BB14-D-256506 | HCD00 |
| 25x8 | 25x8 | KW150 | BB14-C-258258 | HCC00 |
| 25x12 | 25x12 | KW250 | BB14-C-25122512 | HCC00 |
| 30x2 | 30x2 | KW65 | *BB14-C-302302 | HCC00 |
| 30x3 | 30x3 | KW65 | *BB14-C-303303 | HCC00 |
| 30x4 | 30x4 | KW90 | *BB14-C-304304 | HCC00 |
| 30x5 | 30x5 | KW115 | *BB14-C-305305 | HCC00 |
| 30x6 | 30x6 | KW150 | BB14-C-306306 | HCC00 |
| 31x3 | 31x3 | KW90 | *BB14-C-313313 | HCC00 |
| 31x6 | 31x6 | KW150 | *BB14-C-316316 | HCC00 |
| 38x3 | 38x3 | KW90 | *BB14-C-383383 | HCC00 |
| 38x5 | 38x5 | KW150 | *BB14-C-385385 | HCC00 |
| 38x6 | 38x6 | KW200 | *BB14-C-386386 | HCC00 |
| 38x8 | 38x8 | KW250 | BB14-C-388388 | HCC00 |
| 40x3 | 40x3 | KW90 | *BB14-C-403403 | HCC00 |
| 40x4 | 40x4 | KW115 | *BB14-C-404404 | HCC00 |
| 40x5 | 40x5 | KW150 | *BB14-C-405405 | HCC00 |
| 40x6 | 40x6 | KW200 | *BB14-C-406406 | HCC00 |
| 50x3 | 50x3 | KW150 | *BB14-D-503503 | HCD00 |
| 50x4 | 50x4 | KW200 | *BB14-D-504504 | HCD00 |
| 50x5 | 50x5 | KW200 | *BB14-D-505505 | HCD00 |
| 50x6 | 25x6 | KW115 | BB14-C-506256 | HCC00 |
| 50x6 | 50x6 | KW250 | *BB14-D-506506 | HCD00 |
| 50x8 | 50x8 | KW150x2 | BB14-D-508508 | HCD00 |
| 50x10 | 50x10 | KW200x2 | BB14-D-50105010 | HCD00 |
| 60x6 | 60x6 | KW150x2 | BB14-D-606606 | HCD00 |
| 60x8 | 60x8 | KW200x2 | BB14-D-608608 | HCD00 |
| 60x10 | 60x10 | KW250x2 | BB14-D-60106010 | HCD00 |
| 80x6 | 80x6 | KW200x2 | BB14-D-806806 | HCD00 |
| 80x8 | 80x8 | KW250x2 | BB14-D-808808 | HCD00 |
| 80x10 | 80x10 | KW200x3 | BB14-D-80108010 | HCD00 |

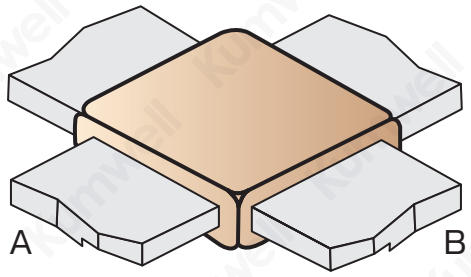
Note: Special requirement can be requested.

Kumwell

# BB40

## Busbar to Busbar

Horizontal flat busbar cross (Uncut)




| Conductor Size | | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|---|
| A(mm.xmm.) | B(mm.xmm.) | | | |
| 20x2 | 20x2 | KW65 | BB40-C-202202 | HCC00 |
| 20x3 | 20x3 | KW90 | BB40-C-203203 | HCC00 |
| 20x5 | 20x5 | KW115 | BB40-C-205205 | HCC00 |
| 25x2 | 25x2 | KW90 | BB40-C-252252 | HCC00 |
| 25x3 | 25x3 | KW90 | BB40-C-253253 | HCC00 |
| 25x4 | 25x4 | KW115 | BB40-C-254254 | HCC00 |
| 25x5 | 25x5 | KW150 | BB40-C-255255 | HCC00 |
| 25x6 | 25x6 | KW150 | BB40-C-256256 | HCC00 |
| 25x8 | 25x8 | KW200 | BB40-C-258258 | HCC00 |
| 25x12 | 25x12 | KW200 | BB40-C-25122512 | HCC00 |
| 30x2 | 30x2 | KW150 | BB40-C-302302 | HCC00 |
| 30x3 | 30x3 | KW200 | BB40-C-303303 | HCC00 |
| 30x4 | 30x4 | KW250 | BB40-C-304304 | HCC00 |
| 30x5 | 30x5 | KW250 | BB40-C-305305 | HCC00 |
| 30x6 | 30x6 | KW250 | BB40-C-306306 | HCC00 |
| 31x3 | 31x3 | KW200 | BB40-C-313313 | HCC00 |
| 31x6 | 31x6 | KW250 | BB40-C-316316 | HCC00 |
| 38x3 | 38x3 | KW250 | BB40-D-383383 | HCD00 |
| 38x5 | 38x5 | KW150x2 | BB40-D-385385 | HCD00 |
| 38x6 | 38x6 | KW150x2 | BB40-D-386386 | HCD00 |
| 38x8 | 38x8 | KW200x2 | BB40-D-388388 | HCD00 |
| 40x3 | 40x3 | KW200x2 | BB40-D-403403 | HCD00 |
| 40x4 | 40x4 | KW200x2 | BB40-D-404404 | HCD00 |
| 40x5 | 40x5 | KW200x2 | BB40-D-405405 | HCD00 |
| 40x6 | 40x6 | KW200x2 | BB40-D-406406 | HCD00 |
| 50x3 | 50x3 | KW250x2 | BB40-D-503503 | HCD00 |
| 50x4 | 50x4 | KW250x2 | BB40-D-504504 | HCD00 |
| 50x5 | 50x5 | KW250x2 | BB40-D-505505 | HCD00 |
| 50x6 | 50x6 | KW250x2 | BB40-D-506506 | HCD00 |
| 50x8 | 50x8 | KW250x3 | BB40-D-508508 | HCD00 |
| 50x10 | 50x10 | KW250x4 | BB40-DR-50105010 | HCD00 |
| 60x6 | 60x6 | KW200x4 | BB40-DR-606606 | HCD00 |
| 60x8 | 60x8 | KW250x4 | BB40-DR-608608 | HCD00 |
| 60x10 | 60x10 | KW250x5 | BB40-DR-60106010 | HCD00 |

### Equipment


Mold


Metal powder


Handle clamp


Steel disk

### Necessary Tools


Mold brush


Busbar brush


File


Flint igniter


Scraper



Tool box

### Recommended Tools

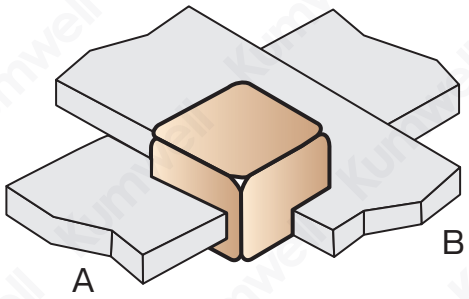
- Butane torch
- Butane gas
- Gloves

Note: Special requirement can be requested.

# BB41

## Busbar to Busbar

Horizontal flat busbar cross




| Conductor Size | | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|---|
| A(mm.xmm.) | B(mm.xmm.) | | | |
| 20x2 | 20x2 | KW65 | BB41-C-202202 | HCC00 |
| 20x3 | 20x3 | KW65 | BB41-C-203203 | HCC00 |
| 20x4 | 20x4 | KW90 | BB41-C-204204 | HCC00 |
| 20x5 | 20x5 | KW90 | BB41-C-205205 | HCC00 |
| 25x2 | 25x2 | KW65 | BB41-C-252252 | HCC00 |
| 25x3 | 25x3 | KW65 | BB41-C-253253 | HCC00 |
| 25x4 | 25x4 | KW90 | BB41-C-254254 | HCC00 |
| 25x5 | 25x5 | KW90 | BB41-C-255255 | HCC00 |
| 25x6 | 25x6 | KW115 | BB41-C-256256 | HCC00 |
| 25x8 | 25x8 | KW250 | BB41-C-258258 | HCC00 |
| 25x12 | 25x12 | KW250 | BB41-C-25122512 | HCC00 |
| 30x2 | 30x2 | KW90 | BB41-C-302302 | HCC00 |
| 30x3 | 30x3 | KW115 | BB41-C-303303 | HCC00 |
| 30x4 | 30x4 | KW115 | BB41-C-304304 | HCC00 |
| 30x5 | 30x5 | KW115 | BB41-C-305305 | HCC00 |
| 30x6 | 30x6 | KW200 | BB41-C-306306 | HCC00 |
| 31x3 | 31x3 | KW115 | BB41-C-313313 | HCC00 |
| 31x6 | 31x6 | KW115 | BB41-C-316316 | HCC00 |
| 38x3 | 38x3 | KW150 | BB41-C-383383 | HCC00 |
| 38x5 | 38x5 | KW150 | BB41-C-385385 | HCC00 |
| 38x6 | 38x6 | KW200 | BB41-C-386386 | HCC00 |
| 38x8 | 38x8 | KW250 | BB41-C-388388 | HCC00 |
| 40x3 | 40x3 | KW150 | BB41-C-403403 | HCC00 |
| 40x4 | 40x4 | KW200 | BB41-C-404404 | HCC00 |
| 40x5 | 40x5 | KW200 | BB41-C-405405 | HCC00 |
| 40x6 | 40x6 | KW200 | BB41-C-406406 | HCC00 |
| 50x3 | 50x3 | KW200 | BB41-D-503503 | HCD00 |
| 50x4 | 50x4 | KW200 | BB41-D-504504 | HCD00 |
| 50x5 | 50x5 | KW200 | BB41-D-505505 | HCD00 |
| 50x6 | 50x6 | KW200 | BB41-D-506506 | HCD00 |
| 50x8 | 50x8 | KW250 | BB41-D-508508 | HCD00 |
| 50x10 | 50x10 | KW150x2 | BB41-D-50105010 | HCD00 |
| 60x6 | 60x6 | KW200 | BB41-D-606606 | HCD00 |
| 60x8 | 60x8 | KW250 | BB41-D-608608 | HCD00 |
| 60x10 | 60x10 | KW150x2 | BB41-D-60106010 | HCD00 |
| 80x6 | 80x6 | KW200 | BB41-D-806806 | HCD00 |
| 80x8 | 80x8 | KW250 | BB41-D-808808 | HCD00 |
| 80x10 | 80x10 | KW150x2 | BB41-D-80108010 | HCD00 |

### Equipment




### Necessary Tools




### Recommended Tools

- Butane torch
- Butane gas
- Gloves

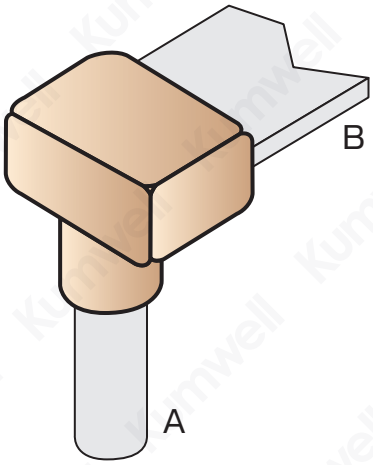
Note: Special requirement can be requested.

Kumwell

# BR1

## Busbar to Ground Rod

Horizontal bus end to ground rod




### Equipment




### Necessary Tools




### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

- For special rod size's requirement, please contact us

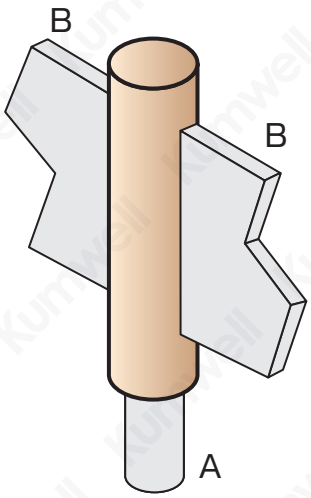
| Rod Size | | Conductor Size | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|---|---|
| A(mm.) | A(inch) | B(mmxmm) | | | |
| 12.7 | 1/2 | 20x2 | KW65 | BR1-C-127202 | HCC00 |
| | | 20x3 | KW90 | BR1-C-127203 | HCC00 |
| | | 20x4 | KW90 | BR1-C-127204 | HCC00 |
| | | 25x2 | KW65 | BR1-C-127252 | HCC00 |
| | | 25x3 | KW90 | BR1-C-127253 | HCC00 |
| | | 25x4 | KW90 | BR1-C-127254 | HCC00 |
| | | 30x2 | KW90 | BR1-C-127302 | HCC00 |
| | | 30x3 | KW90 | BR1-C-127303 | HCC00 |
| | | 40x3 | KW90 | BR1-C-127403 | HCC00 |
| | | 50x3 | KW115 | BR1-C-127503 | HCC00 |
| 14.2 | 5/8 | 20x3 | KW90 | BR1-C-142203 | HCC00 |
| | | 20x4 | KW90 | BR1-C-142204 | HCC00 |
| | | 25x3 | KW90 | BR1-C-142253 | HCC00 |
| | | 25x4 | KW115 | BR1-C-142254 | HCC00 |
| | | 25x5 | KW115 | BR1-C-142255 | HCC00 |
| | | 25x6 | KW115 | BR1-C-142256 | HCC00 |
| | | 30x2 | KW115 | BR1-C-142302 | HCC00 |
| | | 30x3 | KW115 | BR1-C-142303 | HCC00 |
| | | 30x5 | KW150 | BR1-C-142305 | HCC00 |
| | | 30x6 | KW150 | BR1-C-142306 | HCC00 |
| | | 31x3 | KW115 | BR1-C-142313 | HCC00 |
| | | 31x6 | KW150 | BR1-C-142316 | HCC00 |
| | | 38x3 | KW115 | BR1-C-142383 | HCC00 |
| | | 38x5 | KW150 | BR1-C-142385 | HCC00 |
| | | 38x6 | KW200 | BR1-C-142386 | HCC00 |
| | | 40x3 | KW115 | BR1-C-142403 | HCC00 |
| | | 40x4 | KW150 | BR1-C-142404 | HCC00 |
| | | 40x5 | KW150 | BR1-C-142405 | HCC00 |
| | | 40x6 | KW200 | BR1-C-142406 | HCC00 |
| | | 50x3 | KW150 | BR1-C-142503 | HCC00 |
| | | 50x4 | KW200 | BR1-C-142504 | HCC00 |
| | | 50x5 | KW200 | BR1-C-142505 | HCC00 |
| | | 50x6 | KW200 | BR1-C-142506 | HCC00 |
| 17.2 | 3/4 | 20x3 | KW115 | BR1-C-172203 | HCC00 |
| | | 20x4 | KW150 | BR1-C-172204 | HCC00 |
| | | 25x3 | KW150 | BR1-C-172253 | HCC00 |
| | | 25x4 | KW150 | BR1-C-172254 | HCC00 |
| | | 25x5 | KW150 | BR1-C-172255 | HCC00 |
| | | 25x6 | KW200 | BR1-C-172256 | HCC00 |
| | | 30x2 | KW150 | BR1-C-172302 | HCC00 |
| | | 30x3 | KW150 | BR1-C-172303 | HCC00 |
| | | 30x5 | KW200 | BR1-C-172305 | HCC00 |
| | | 30x6 | KW250 | BR1-C-172306 | HCC00 |
| | | 31x3 | KW150 | BR1-C-172313 | HCC00 |
| | | 31x6 | KW250 | BR1-C-172316 | HCC00 |
| | | 38x3 | KW200 | BR1-C-172383 | HCC00 |
| | | 38x5 | KW200 | BR1-C-172385 | HCC00 |
| | | 38x6 | KW150x2 | BR1-C-172386 | HCC00 |
| | | 40x3 | KW200 | BR1-C-172403 | HCC00 |
| | | 40x4 | KW200 | BR1-C-172404 | HCC00 |
| | | 40x5 | KW150x2 | BR1-D-172405 | HCD00 |
| | | 40x6 | KW150x2 | BR1-D-172406 | HCD00 |
| | | 50x3 | KW150x2 | BR1-D-172503 | HCD00 |
| | | 50x4 | KW150x2 | BR1-D-172504 | HCD00 |
| | | 50x5 | KW150x2 | BR1-D-172505 | HCD00 |
| | | 50x6 | KW200x2 | BR1-D-172506 | HCD00 |

Note: Special requirement can be requested.

# BR2

## Busbar to Ground Rod

Horizontal thru bus to ground rod




### Equipment




### Necessary Tools




### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

- For special rod size's requirement, please contact us
- "*" means to meet UL Listed

| Rod Size | | Conductor Size | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|---|---|
| A(mm.) | A(inch) | B(mmxmm) | | | |
| 12.7 | 1/2 | 20x2 | KW65 | *BR2-C-127202 | HCC00 |
| | | 20x3 | KW90 | *BR2-C-127203 | HCC00 |
| | | 20x4 | KW90 | *BR2-C-127204 | HCC00 |
| | | 25x2 | KW65 | *BR2-C-127252 | HCC00 |
| | | 25x3 | KW90 | *BR2-C-127253 | HCC00 |
| | | 25x4 | KW90 | *BR2-C-127254 | HCC00 |
| | | 30x2 | KW90 | *BR2-C-127302 | HCC00 |
| | | 30x3 | KW90 | *BR2-C-127303 | HCC00 |
| | | 40x3 | KW90 | *BR2-C-127403 | HCC00 |
| | | 50x3 | KW115 | *BR2-C-127503 | HCC00 |
| 14.2 | 5/8 | 20x3 | KW90 | *BR2-C-142203 | HCC00 |
| | | 20x4 | KW90 | *BR2-C-142204 | HCC00 |
| | | 25x2 | KW90 | BR2-C-142252 | HCC00 |
| | | 25x3 | KW90 | *BR2-C-142253 | HCC00 |
| | | 25x4 | KW115 | *BR2-C-142254 | HCC00 |
| | | 25x5 | KW115 | BR2-C-142255 | HCC00 |
| | | 25x6 | KW150 | BR2-C-142256 | HCC00 |
| | | 30x2 | KW90 | *BR2-C-142302 | HCC00 |
| | | 30x3 | KW115 | *BR2-C-142303 | HCC00 |
| | | 30x5 | KW150 | BR2-C-142305 | HCC00 |
| | | 30x6 | KW150 | BR2-C-142306 | HCC00 |
| | | 31x3 | KW115 | *BR2-C-142313 | HCC00 |
| | | 31x6 | KW150 | BR2-C-142316 | HCC00 |
| | | 38x3 | KW150 | *BR2-C-142383 | HCC00 |
| | | 38x5 | KW150 | BR2-C-142385 | HCC00 |
| | | 38x6 | KW200 | BR2-C-142386 | HCC00 |
| | | 40x3 | KW150 | *BR2-C-142403 | HCC00 |
| | | 40x4 | KW150 | BR2-C-142404 | HCC00 |
| | | 40x5 | KW150 | BR2-C-142405 | HCC00 |
| | | 40x6 | KW200 | BR2-C-142406 | HCC00 |
| | | 50x3 | KW200 | BR2-C-142503 | HCC00 |
| | | 50x4 | KW200 | BR2-C-142504 | HCC00 |
| | | 50x5 | KW200 | BR2-C-142505 | HCC00 |
| | | 50x6 | KW250 | BR2-C-142506 | HCC00 |
| 17.2 | 3/4 | 20x3 | KW150 | *BR2-C-172203 | HCC00 |
| | | 20x4 | KW150 | *BR2-C-172204 | HCC00 |
| | | 25x2 | KW150 | *BR2-C-172252 | HCC00 |
| | | 25x3 | KW150 | *BR2-C-172253 | HCC00 |
| | | 25x4 | KW200 | *BR2-C-172254 | HCC00 |
| | | 25x5 | KW200 | *BR2-C-172255 | HCC00 |
| | | 25x6 | KW200 | *BR2-C-172256 | HCC00 |
| | | 30x2 | KW150 | *BR2-C-172302 | HCC00 |
| | | 30x3 | KW150 | *BR2-C-172303 | HCC00 |
| | | 30x5 | KW200 | *BR2-C-172305 | HCC00 |
| | | 30x6 | KW250 | BR2-C-172306 | HCC00 |
| | | 31x3 | KW200 | *BR2-C-172313 | HCC00 |
| | | 31x6 | KW250 | BR2-C-172316 | HCC00 |
| | | 38x3 | KW200 | *BR2-C-172383 | HCC00 |
| | | 38x5 | KW200 | BR2-C-172385 | HCC00 |
| | | 38x6 | KW250 | BR2-C-172386 | HCC00 |
| | | 40x3 | KW200 | *BR2-C-172403 | HCC00 |
| | | 40x4 | KW200 | BR2-C-172404 | HCC00 |
| | | 40x5 | KW200 | BR2-C-172405 | HCC00 |
| | | 40x6 | KW250 | BR2-C-172406 | HCC00 |
| | | 50x3 | KW150x2 | BR2-D-172503 | HCD00 |
| | | 50x4 | KW150x2 | BR2-D-172504 | HCD00 |
| | | 50x5 | KW150x2 | BR2-D-172505 | HCD00 |
| | | 50x6 | KW150x2 | BR2-D-172506 | HCD00 |

Note: Special requirement can be requested.

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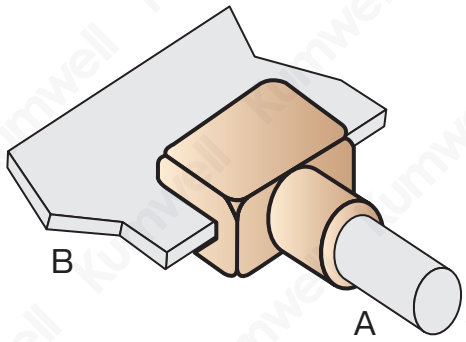
# BR4

## Busbar to Ground Rod

Horizontal ground rodtap to horizontal busbar




### Equipment




### Necessary Tools




### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

- SC means Solid Copper

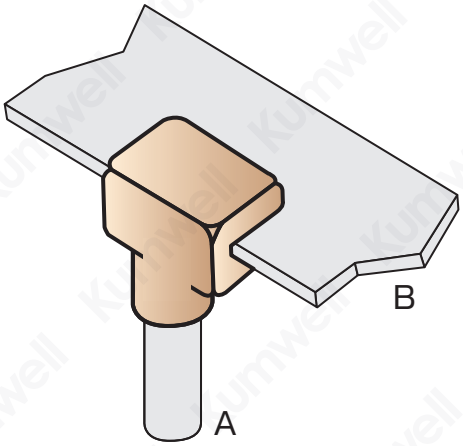
| Rod Size | | Conductor Size | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|---|---|
| A(mm.) | A(inch) | B(mmxmm) | | | |
| 12.7 | 1/2 | 20x2 | KW90 | BR4-C-127202 | HCC00 |
| | | 20x3 | KW90 | BR4-C-127203 | HCC00 |
| | | 20x4 | KW90 | BR4-C-127204 | HCC00 |
| | | 25x2 | KW90 | BR4-C-127252 | HCC00 |
| | | 25x3 | KW90 | BR4-C-127253 | HCC00 |
| | | 25x4 | KW90 | BR4-C-127254 | HCC00 |
| | | 30x2 | KW90 | BR4-C-127302 | HCC00 |
| | | 30x3 | KW90 | BR4-C-127303 | HCC00 |
| | | 40x3 | KW90 | BR4-C-127403 | HCC00 |
| | | 50x3 | KW90 | BR4-C-127503 | HCC00 |
| 14.2 | 5/8 | 20x3 | KW90 | BR4-C-142203 | HCC00 |
| | | 20x4 | KW90 | BR4-C-142204 | HCC00 |
| | | 25x3 | KW90 | BR4-C-142253 | HCC00 |
| | | 25x4 | KW90 | BR4-C-142254 | HCC00 |
| | | 25x5 | KW90 | BR4-C-142255 | HCC00 |
| | | 25x6 | KW115 | BR4-C-142256 | HCC00 |
| | | 30x2 | KW90 | BR4-C-142302 | HCC00 |
| | | 30x3 | KW90 | BR4-C-142303 | HCC00 |
| | | 30x6 | KW115 | BR4-C-142306 | HCC00 |
| | | 31x3 | KW90 | BR4-C-142313 | HCC00 |
| | | 31x6 | KW115 | BR4-C-142316 | HCC00 |
| | | 38x3 | KW90 | BR4-C-142383 | HCC00 |
| | | 38x5 | KW90 | BR4-C-142385 | HCC00 |
| | | 38x6 | KW115 | BR4-C-142386 | HCC00 |
| | | 38x8 | KW150 | BR4-C-142388 | HCC00 |
| | | 40x3 | KW90 | BR4-C-142403 | HCC00 |
| | | 40x4 | KW90 | BR4-C-142404 | HCC00 |
| | | 40x5 | KW90 | BR4-C-142405 | HCC00 |
| | | 40x6 | KW115 | BR4-C-142406 | HCC00 |
| | | 50x3 | KW90 | BR4-C-142503 | HCC00 |
| | | 50x4 | KW90 | BR4-C-142504 | HCC00 |
| | | 50x5 | KW90 | BR4-C-142505 | HCC00 |
| | | 50x6 | KW115 | BR4-C-142506 | HCC00 |
| 17.2 | 3/4 | 20x3 | KW115 | BR4-C-172203 | HCC00 |
| | | 20x4 | KW150 | BR4-C-172204 | HCC00 |
| | | 25x3 | KW115 | BR4-C-172253 | HCC00 |
| | | 25x4 | KW150 | BR4-C-172254 | HCC00 |
| | | 25x5 | KW150 | BR4-C-172255 | HCC00 |
| | | 25x6 | KW150 | BR4-C-172256 | HCC00 |
| | | 30x2 | KW115 | BR4-C-172302 | HCC00 |
| | | 30x3 | KW115 | BR4-C-172303 | HCC00 |
| | | 30x6 | KW150 | BR4-C-172306 | HCC00 |
| | | 31x3 | KW115 | BR4-C-172313 | HCC00 |
| | | 31x6 | KW150 | BR4-C-172316 | HCC00 |
| | | 38x3 | KW115 | BR4-C-172383 | HCC00 |
| | | 38x5 | KW150 | BR4-C-172385 | HCC00 |
| | | 38x6 | KW150 | BR4-C-172386 | HCC00 |
| | | 38x8 | KW200 | BR4-C-172388 | HCC00 |
| | | 40x3 | KW115 | BR4-C-172403 | HCC00 |
| | | 40x4 | KW150 | BR4-C-172404 | HCC00 |
| | | 40x5 | KW150 | BR4-C-172405 | HCC00 |
| | | 40x6 | KW150 | BR4-C-172406 | HCC00 |
| | | 50x3 | KW115 | BR4-C-172503 | HCC00 |
| | | 50x4 | KW150 | BR4-C-172504 | HCC00 |
| | | 50x5 | KW150 | BR4-C-172505 | HCC00 |
| | | 50x6 | KW150 | BR4-C-172506 | HCC00 |

Note: Special requirement can be requested.

# BR7

## Busbar to Ground Rod

Horizontal flat bar thru to ground rod




| Rod Size | | Conductor Size | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|---|---|
| A(mm.) | A(inch) | B(mmxmm) | | | |
| 12.7 | 1/2 | 20x2 | KW65 | BR7-C-127202 | HCC00 |
| | | 20x3 | KW65 | BR7-C-127203 | HCC00 |
| | | 20x4 | KW90 | BR7-C-127204 | HCC00 |
| | | 25x2 | KW65 | BR7-C-127252 | HCC00 |
| | | 25x3 | KW90 | BR7-C-127253 | HCC00 |
| | | 25x4 | KW90 | BR7-C-127254 | HCC00 |
| | | 30x2 | KW65 | BR7-C-127302 | HCC00 |
| | | 30x3 | KW65 | BR7-C-127303 | HCC00 |
| | | 40x3 | KW65 | BR7-C-127403 | HCC00 |
| | | 50x3 | KW65 | BR7-C-127503 | HCC00 |
| 14.2 | 5/8 | 20x3 | KW90 | BR7-C-142203 | HCC00 |
| | | 20x4 | KW115 | BR7-C-142204 | HCC00 |
| | | 25x3 | KW90 | BR7-C-142253 | HCC00 |
| | | 25x4 | KW115 | BR7-C-142254 | HCC00 |
| | | 25x5 | KW150 | BR7-C-142255 | HCC00 |
| | | 25x6 | KW150 | BR7-C-142256 | HCC00 |
| | | 30x2 | KW90 | BR7-C-142302 | HCC00 |
| | | 30x3 | KW90 | BR7-C-142303 | HCC00 |
| | | 30x5 | KW150 | BR7-C-142305 | HCC00 |
| | | 30x6 | KW150 | BR7-C-142306 | HCC00 |
| | | 40x3 | KW90 | BR7-C-142403 | HCC00 |
| | | 40x5 | KW150 | BR7-C-142405 | HCC00 |
| | | 40x6 | KW150 | BR7-C-142406 | HCC00 |
| | | 50x3 | KW90 | BR7-C-142503 | HCC00 |
| | | 50x4 | KW150 | BR7-C-142504 | HCC00 |
| | | 50x5 | KW150 | BR7-C-142505 | HCC00 |
| | | 50x6 | KW150 | BR7-C-142506 | HCC00 |
| 17.2 | 3/4 | 20x3 | KW115 | BR7-C-172203 | HCC00 |
| | | 20x4 | KW115 | BR7-C-172204 | HCC00 |
| | | 25x3 | KW115 | BR7-C-172253 | HCC00 |
| | | 25x4 | KW150 | BR7-C-172254 | HCC00 |
| | | 25x6 | KW200 | BR7-C-172256 | HCC00 |
| | | 30x2 | KW115 | BR7-C-172302 | HCC00 |
| | | 30x3 | KW115 | BR7-C-172303 | HCC00 |
| | | 30x5 | KW200 | BR7-C-172305 | HCC00 |
| | | 30x6 | KW200 | BR7-C-172306 | HCC00 |
| | | 40x3 | KW115 | BR7-C-172403 | HCC00 |
| | | 40x5 | KW200 | BR7-C-172405 | HCC00 |
| | | 40x6 | KW200 | BR7-C-172406 | HCC00 |
| | | 50x3 | KW115 | BR7-C-172503 | HCC00 |
| | | 50x5 | KW200 | BR7-C-172505 | HCC00 |
| | | 50x6 | KW200 | BR7-C-172506 | HCC00 |

### Equipment




### Necessary Tools




### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

- For special rod size's requirement, please contact us

Note: Special requirement can be requested.

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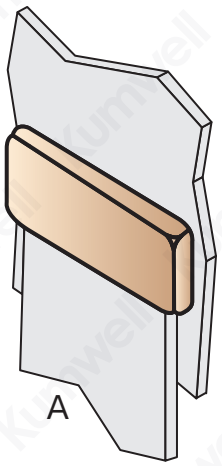
# BS1

## Busbar to Steel Surface

Vertical busbar tap to vertical steel surface




| Conductor Size A(mm.xmm.) | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|
| 20x2 | KW65 | BS1-C-202 | HCC00-Y |
| 20x3 | KW65 | BS1-C-203 | HCC00-Y |
| 20x4 | KW90 | BS1-C-204 | HCC00-Y |
| 20x5 | KW115 | BS1-C-205 | HCC00-Y |
| 25x2 | KW90 | BS1-C-252 | HCC00-Y |
| 25x3 | KW90 | BS1-C-253 | HCC00-Y |
| 25x4 | KW90 | BS1-C-254 | HCC00-Y |
| 25x5 | KW150 | BS1-C-255 | HCC00-Y |
| 25x6 | KW150 | BS1-C-256 | HCC00-Y |
| 25x8 | KW200 | BS1-C-258 | HCC00-Y |
| 25x12 | KW250 | BS1-C-2512 | HCC00-Y |
| 30x2 | KW90 | BS1-C-302 | HCC00-Y |
| 30x3 | KW90 | BS1-C-303 | HCC00-Y |
| 30x4 | KW115 | BS1-C-304 | HCC00-Y |
| 30x5 | KW150 | BS1-C-305 | HCC00-Y |
| 30x6 | KW200 | BS1-C-306 | HCC00-Y |
| 31x3 | KW90 | BS1-C-313 | HCC00-Y |
| 31x6 | KW200 | BS1-C-316 | HCC00-Y |
| 38x3 | KW150 | BS1-C-383 | HCC00-Y |
| 38x5 | KW200 | BS1-C-385 | HCC00-Y |
| 38x6 | KW250 | BS1-C-386 | HCC00-Y |
| 38x8 | KW250 | BS1-C-388 | HCC00-Y |
| 40x3 | KW150 | BS1-C-403 | HCC00-Y |
| 40x4 | KW200 | BS1-C-404 | HCC00-Y |
| 40x5 | KW200 | BS1-C-405 | HCC00-Y |
| 40x6 | KW250 | BS1-C-406 | HCC00-Y |
| 50x3 | KW200 | BS1-C-503 | HCC00-Y |
| 50x4 | KW250 | BS1-C-504 | HCC00-Y |
| 50x5 | KW250 | BS1-C-505 | HCC00-Y |
| 50x6 | KW150x2 | BS1-D-506 | HCD00-Y |
| 50x8 | KW200x2 | BS1-D-508 | HCD00-Y |
| 50x10 | KW200x2 | BS1-D-5010 | HCD00-Y |
| 60x6 | KW200x2 | BS1-D-606 | HCD00-Y |
| 60x8 | KW250x2 | BS1-D-608 | HCD00-Y |
| 60x10 | KW200x3 | BS1-D-6010 | HCD00-Y |
| 80x6 | KW250x2 | BS1-D-806 | HCD00-Y |
| 80x8 | KW200x3 | BS1-D-808 | HCD00-Y |
| 80x10 | KW250x3 | BS1-D-8010 | HCD00-Y |

### Equipment




### Necessary Tools




### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

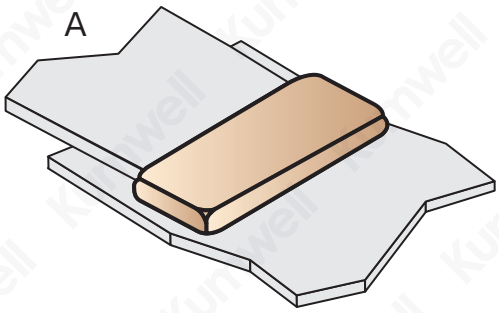
- For perfect welding, making connection need to remove moisture, oxide and galvanized metal
- After welding process, coating steel's surface and connection by Rust-Oleum cold galvanizing is required

Note: Special requirement can be requested.

# BS2

## Busbar to Steel Surface

Horizontal busbar tap to herizontal steel surface




| Conductor Size A(mm.xmm.) | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|
| 20x2 | KW65 | BS2-C-202 | HCC00 |
| 20x3 | KW90 | BS2-C-203 | HCC00 |
| 20x4 | KW90 | BS2-C-204 | HCC00 |
| 20x5 | KW115 | BS2-C-205 | HCC00 |
| 25x2 | KW90 | BS2-C-252 | HCC00 |
| 25x3 | KW90 | BS2-C-253 | HCC00 |
| 25x4 | KW90 | BS2-C-254 | HCC00 |
| 25x5 | KW150 | BS2-C-255 | HCC00 |
| 25x6 | KW150 | BS2-C-256 | HCC00 |
| 25x8 | KW200 | BS2-C-258 | HCC00 |
| 25x12 | KW250 | BS2-C-2512 | HCC00 |
| 30x2 | KW115 | BS2-C-302 | HCC00 |
| 30x3 | KW115 | BS2-C-303 | HCC00 |
| 30x4 | KW150 | BS2-C-304 | HCC00 |
| 30x5 | KW200 | BS2-C-305 | HCC00 |
| 30x6 | KW200 | BS2-C-306 | HCC00 |
| 31x3 | KW115 | BS2-C-313 | HCC00 |
| 31x6 | KW200 | BS2-C-316 | HCC00 |
| 38x3 | KW150 | BS2-C-383 | HCC00 |
| 38x5 | KW200 | BS2-C-385 | HCC00 |
| 38x6 | KW200 | BS2-C-386 | HCC00 |
| 38x8 | KW250 | BS2-C-388 | HCC00 |
| 40x3 | KW115 | BS2-C-403 | HCC00 |
| 40x4 | KW200 | BS2-C-404 | HCC00 |
| 40x5 | KW200 | BS2-C-405 | HCC00 |
| 40x6 | KW250 | BS2-C-406 | HCC00 |
| 50x3 | KW200 | BS2-D-503 | HCD00 |
| 50x4 | KW250 | BS2-D-504 | HCD00 |
| 50x5 | KW250 | BS2-D-505 | HCD00 |
| 50x6 | KW150x2 | BS2-D-506 | HCD00 |
| 50x8 | KW200x2 | BS2-D-508 | HCD00 |
| 50x10 | KW200x2 | BS2-D-5010 | HCD00 |
| 60x6 | KW200x2 | BS2-D-606 | HCD00 |
| 60x8 | KW250x2 | BS2-D-608 | HCD00 |
| 60x10 | KW200x3 | BS2-D-6010 | HCD00 |
| 80x6 | KW250x2 | BS2-D-806 | HCD00 |
| 80x8 | KW200x3 | BS2-D-808 | HCD00 |
| 80x10 | KW250x3 | BS2-D-8010 | HCD00 |

### Equipment




### Necessary Tools




### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

- For perfect welding, making connection need to remove moisture, oxide and galvanized metal
- After welding process, coating steel's surface and connection by Rust-Oleum cold galvanizing is required

Note: Special requirement can be requested.

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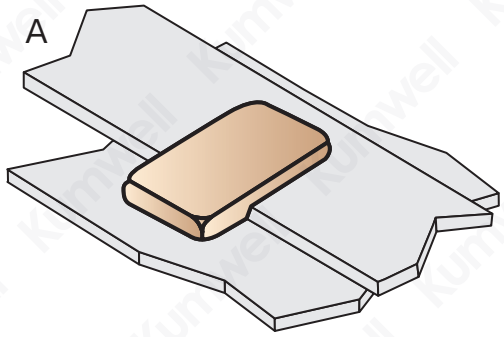
# BS3

## Busbar to Steel Surface

Horizontal busbar tap to herizontal steel surface




| Conductor Size A(mm.xmm.) | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|
| 20x2 | KW65 | BS3-C-202 | HCC00 |
| 20x3 | KW90 | BS3-C-203 | HCC00 |
| 20x4 | KW115 | BS3-C-204 | HCC00 |
| 20x5 | KW115 | BS3-C-205 | HCC00 |
| 25x2 | KW90 | BS3-C-252 | HCC00 |
| 25x3 | KW115 | BS3-C-253 | HCC00 |
| 25x4 | KW115 | BS3-C-254 | HCC00 |
| 25x5 | KW115 | BS3-C-255 | HCC00 |
| 25x6 | KW150 | BS3-C-256 | HCC00 |
| 25x8 | KW200 | BS3-C-258 | HCC00 |
| 25x12 | KW250 | BS3-C-2512 | HCC00 |
| 30x2 | KW115 | BS3-C-302 | HCC00 |
| 30x3 | KW115 | BS3-C-303 | HCC00 |
| 30x4 | KW150 | BS3-C-304 | HCC00 |
| 30x5 | KW200 | BS3-C-305 | HCC00 |
| 30x6 | KW200 | BS3-C-306 | HCC00 |
| 31x3 | KW115 | BS3-C-313 | HCC00 |
| 31x6 | KW200 | BS3-C-316 | HCC00 |
| 38x3 | KW150 | BS3-C-383 | HCC00 |
| 38x5 | KW200 | BS3-C-385 | HCC00 |
| 38x6 | KW200 | BS3-C-386 | HCC00 |
| 38x8 | KW250 | BS3-C-388 | HCC00 |
| 40x3 | KW150 | BS3-C-403 | HCC00 |
| 40x4 | KW200 | BS3-C-404 | HCC00 |
| 40x5 | KW250 | BS3-C-405 | HCC00 |
| 40x6 | KW250 | BS3-C-406 | HCC00 |
| 50x3 | KW200 | BS3-D-503 | HCD00 |
| 50x4 | KW250 | BS3-D-504 | HCD00 |
| 50x5 | KW250 | BS3-D-505 | HCD00 |
| 50x6 | KW150x2 | BS3-D-506 | HCD00 |
| 50x8 | KW150x2 | BS3-D-508 | HCD00 |
| 50x10 | KW200x2 | BS3-D-5010 | HCD00 |
| 60x6 | KW200x2 | BS3-D-606 | HCD00 |
| 60x8 | KW150x2 | BS3-D-608 | HCD00 |
| 60x10 | KW200x2 | BS3-D-6010 | HCD00 |
| 80x6 | KW150x2 | BS3-D-806 | HCD00 |
| 80x8 | KW200x2 | BS3-D-808 | HCD00 |
| 80x10 | KW250x2 | BS3-D-8010 | HCD00 |

### Equipment


Mold


Metal powder


Handle clamp


Steel disk

### Necessary Tools


Mold brush


Busbar brush


File


Flint igniter


Scraper



Tool box

### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

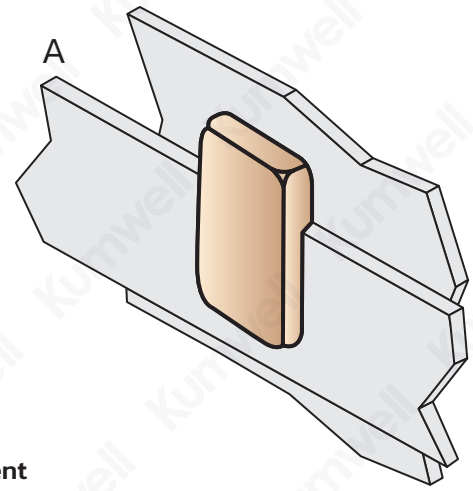
- For perfect welding, making connection need to remove moisture, oxide and galvanized metal
- After welding process, coating steel's surface and connection by Rust-Oleum cold galvanizing is required

Note: Special requirement can be requested.

# BS4

## Busbar to Steel Surface

Horizontal thru bus to vertical steel surface




| Conductor Size A(mm.xmm.) | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|
| 20x2 | KW90 | BS4-C-202 | HCC00-Y |
| 20x3 | KW90 | BS4-C-203 | HCC00-Y |
| 20x4 | KW115 | BS4-C-204 | HCC00-Y |
| 20x5 | KW150 | BS4-C-205 | HCC00-Y |
| 25x2 | KW115 | BS4-C-252 | HCC00-Y |
| 25x3 | KW115 | BS4-C-253 | HCC00-Y |
| 25x4 | KW150 | BS4-C-254 | HCC00-Y |
| 25x5 | KW150 | BS4-C-255 | HCC00-Y |
| 25x6 | KW150 | BS4-C-256 | HCC00-Y |
| 25x8 | KW200 | BS4-C-258 | HCC00-Y |
| 25x12 | KW250 | BS4-C-2512 | HCC00-Y |
| 30x2 | KW115 | BS4-C-302 | HCC00-Y |
| 30x3 | KW115 | BS4-C-303 | HCC00-Y |
| 30x4 | KW115 | BS4-C-304 | HCC00-Y |
| 30x5 | KW200 | BS4-C-305 | HCC00-Y |
| 30x6 | KW200 | BS4-C-306 | HCC00-Y |
| 31x3 | KW150 | BS4-C-313 | HCC00-Y |
| 31x6 | KW200 | BS4-C-316 | HCC00-Y |
| 38x3 | KW150 | BS4-C-383 | HCC00-Y |
| 38x5 | KW200 | BS4-C-385 | HCC00-Y |
| 38x6 | KW250 | BS4-C-386 | HCC00-Y |
| 38x8 | KW250 | BS4-C-388 | HCC00-Y |
| 40x3 | KW150 | BS4-C-403 | HCC00-Y |
| 40x4 | KW200 | BS4-C-404 | HCC00-Y |
| 40x5 | KW200 | BS4-C-405 | HCC00-Y |
| 40x6 | KW250 | BS4-C-406 | HCC00-Y |
| 50x3 | KW200 | BS4-C-503 | HCC00-Y |
| 50x4 | KW250 | BS4-C-504 | HCC00-Y |
| 50x5 | KW250 | BS4-C-505 | HCC00-Y |
| 50x6 | KW150x2 | BS4-D-506 | HCD00-Y |
| 50x8 | KW200x2 | BS4-D-508 | HCD00-Y |
| 50x10 | KW200x2 | BS4-D-5010 | HCD00-Y |
| 60x6 | KW200x2 | BS4-D-606 | HCD00-Y |
| 60x8 | KW250x2 | BS4-D-608 | HCD00-Y |
| 60x10 | KW250x3 | BS4-D-6010 | HCD00-Y |
| 80x6 | KW150x2 | BS4-D-806 | HCD00-Y |
| 80x8 | KW200x2 | BS4-D-808 | HCD00-Y |
| 80x10 | KW250x2 | BS4-D-8010 | HCD00-Y |

### Equipment




### Necessary Tools




### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

- For perfect welding, making connection need to remove moisture, oxide and galvanized metal
- After welding process, coating steel's surface and connection by Rust-Oleum cold galvanizing is required

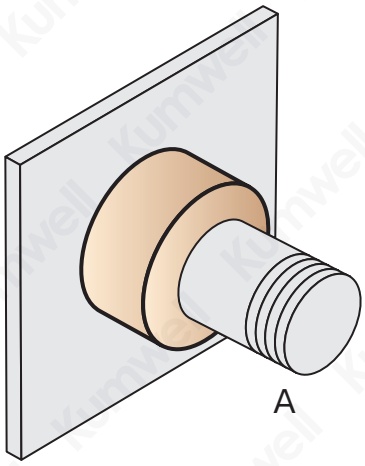
Note: Special requirement can be requested.

Kumwell

# RS1

## Stud to Steel

Horizontal stud to vertical steel surface




| Stud Size A(mm.) | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|
| M6 | KW25 | RS1-C-M6 | HCC00-Y |
| M8 | KW32 | RS1-C-M8 | HCC00-Y |
| M10 | KW45 | RS1-C-M10 | HCC00-Y |
| M12 | KW65 | RS1-C-M12 | HCC00-Y |
| M16 | KW115 | RS1-C-M16 | HCC00-Y |

### Equipment




### Necessary Tools




### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

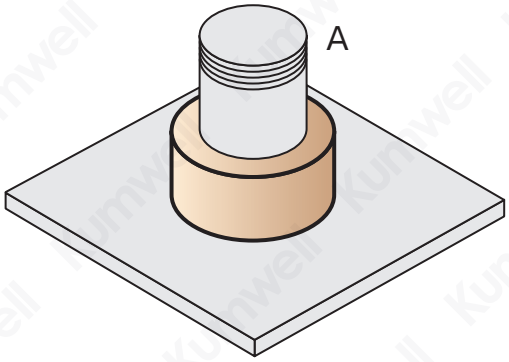
- For special rod size's requirement, please contact us

Note: Special requirement can be requested.

# RS2

## Stud to Steel

Vertical stud to herizontal steel surface




| Stud Size A(mm.) | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|
| M6 | KW25 | RS2-CL-M6 | HCC00 |
| M8 | KW32 | RS2-CL-M8 | HCC00 |
| M10 | KW45 | RS2-CL-M10 | HCC00 |
| M12 | KW65 | RS2-CL-M12 | HCC00 |
| M16 | KW115 | RS2-CL-M16 | HCC00 |

### Equipment



| Mold | Metal powder |
|---|---|
| Handle clamp | Steel disk |

### Necessary Tools



| Mold brush | Cable clean brush | Busbar brush |
|---|---|---|
| Flint igniter | Scraper | Tool box |

### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

- For perfect welding, between conductor and flat steel, making connection need to remove moisture, oxide and galvanized metal
- After welding process, coating steel's surface and connection by Rust-Oleum cold galvanizing is required

Note: Special requirement can be requested.

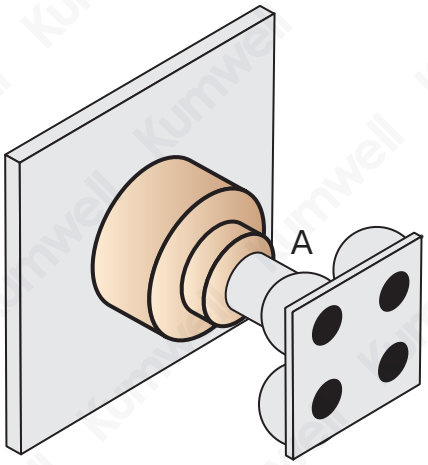
Kumwell

# RS3

## Stud to Steel

Ground plates to vertical steel

| Rod Size A(mm.) | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|
| 12.7 | KW150 | RS3-C-127 | HCC00-Y |




### Equipment




### Necessary Tools




### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

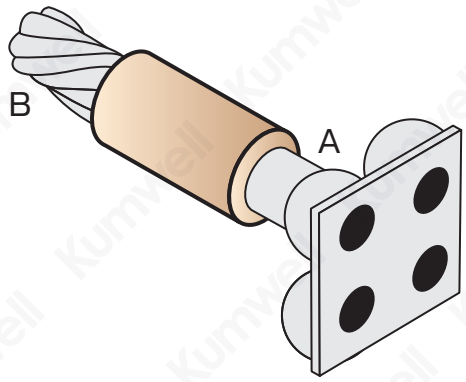
- For perfect welding, between conductor and flat steel, making connection need to remove moisture, oxide and galvanized metal
- After welding process, coating steel's surface and connection by Rust-Oleum cold galvanizing is required

Note: Special requirement can be requested.

# RC1

## Ground Plates to Cable & Steel

Ground plates to herizontal steel cable end




| Rod Size | Conductor Size | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|---|
| A(mm.) | B(mm²) | | | |
| 12.7 | 50 | KW65 | RC1-C-12750 | HCC00 |
| | 70 | KW90 | RC1-C-12770 | HCC00 |
| | 95 | KW90 | RC1-C-12795 | HCC00 |
| | 120 | KW115 | RC1-C-127120 | HCC00 |
| | 150 | KW115 | RC1-C-127150 | HCC00 |
| | 185 | KW150 | RC1-C-127185 | HCC00 |
| | 240 | KW200 | RC1-C-127240 | HCC00 |
| | 300 | KW250 | RC1-C-127300 | HCC00 |

### Equipment


Mold


Metal powder


Handle clamp


Steel disk

### Necessary Tools


Mold brush


Cable clean brush


File


Flint igniter


Scraper



Tool box

### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

- For perfect connection, Remove oxide and moisture where making connection

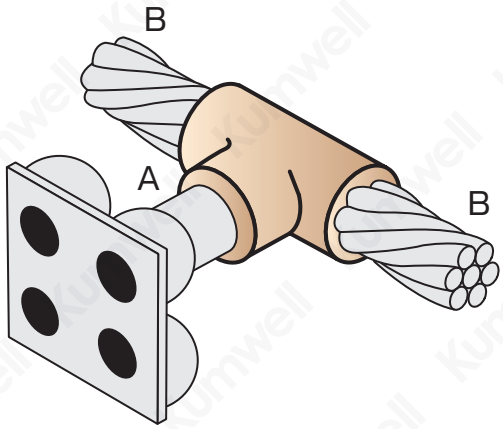
Note: Special requirement can be requested.

Kumwell

# RC2

## Ground Plates to Cable & Steel

Ground plates to herizontal cable thru




| Rod Size | Conductor Size | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|---|
| A(mm.) | B(mm²) | | | |
| 12.7 | 50 | KW90 | RC2-C-12750 | HCC00 |
| | 70 | KW90 | RC2-C-12770 | HCC00 |
| | 95 | KW90 | RC2-C-12795 | HCC00 |
| | 120 | KW115 | RC2-C-127120 | HCC00 |
| | 150 | KW115 | RC2-C-127150 | HCC00 |
| | 185 | KW115 | RC2-C-127185 | HCC00 |
| | 240 | KW150 | RC2-C-127240 | HCC00 |
| | 300 | KW150 | RC2-C-127300 | HCC00 |

### Equipment




### Necessary Tools




### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

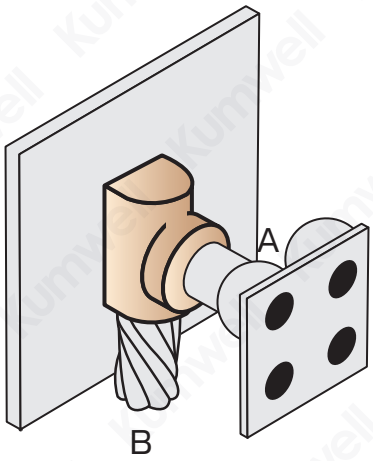
- For perfect connection, Remove oxide and moisture where making connection

Note: Special requirement can be requested.

# CRS1

## Ground Plates to Cable & Steel

Ground plates to vertical steel and cable down




| Rod Size | Conductor Size | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|---|
| A(mm.) | B(mm²) | | | |
| 12.7 | 50 | KW200 | CRS1-C-12750 | HCC00-Y |
| | 70 | KW200 | CRS1-C-12770 | HCC00-Y |
| | 95 | KW250 | CRS1-C-12795 | HCC00-Y |
| | 120 | KW250 | CRS1-C-127120 | HCC00-Y |

### Equipment



Mold | Metal powder

Handle clamp | Steel disk

### Necessary Tools



Mold brush | Cable clean brush | Busbar brush

Flint igniter | Scraper | Tool box

### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

- For perfect welding, between conductor and flat steel, making connection need to remove moisture, oxide and galvanized metal
- After welding process, coating steel's surface and connection by Rust-Oleum cold galvanizing is required

Note: Special requirement can be requested.

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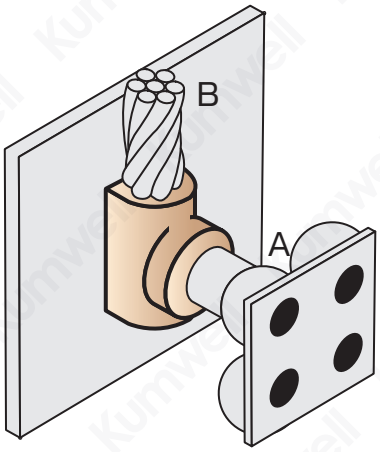
# CRS2

## Ground Plates to Cable & Steel

Ground plates to vertical steel and cable up




| Rod Size | Conductor Size | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|---|
| A(mm.) | B(mm²) | | | |
| 12.7 | 50 | KW200 | CRS2-C-12750 | HCC00-Y |
| | 70 | KW200 | CRS2-C-12770 | HCC00-Y |
| | 95 | KW250 | CRS2-C-12795 | HCC00-Y |
| | 120 | KW250 | CRS2-C-127120 | HCC00-Y |

### Equipment


Mold


Metal powder


Handle clamp


Steel disk

### Necessary Tools


Mold brush


Cable clean brush


Busbar brush


Flint igniter


Scraper



Tool box

### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

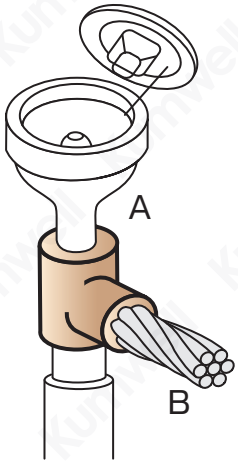
- For perfect welding, between conductor and flat steel, making connection need to remove moisture, oxide and galvanized metal
- After welding process, coating steel's surface and connection by Rust-Oleum cold galvanizing is required

Note: Special requirement can be requested.

# AC1

## Cable to Grounding Receptacle

Horizontal cable to ground receptacle




### For GYSER 663

| Rod Size | Conductor Size | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|---|
| A(mm.) | B(mm²) | | | |
| 12.7 | 35 | KW90 | AC1-C-12735663 | HCC00 |
| | 50 | KW90 | AC1-C-12750663 | HCC00 |
| | 70 | KW90 | AC1-C-12770663 | HCC00 |
| | 95 | KW115 | AC1-C-12795663 | HCC00 |
| | 120 | KW115 | AC1-C-127120663 | HCC00 |

### For GYSER 993

| Rod Size | Conductor Size | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|---|
| A(mm.) | B(mm²) | | | |
| 12.7 | 35 | KW90 | AC1-C-12735993 | HCC00 |
| | 50 | KW90 | AC1-C-12750993 | HCC00 |
| | 70 | KW90 | AC1-C-12770993 | HCC00 |
| | 95 | KW115 | AC1-C-12795993 | HCC00 |
| | 120 | KW115 | AC1-C-127120993 | HCC00 |

### Equipment




### Necessary Tools




### Recommended Tools

- Butane torch
- Butane gas
- Gloves

Note: Special requirement can be requested.

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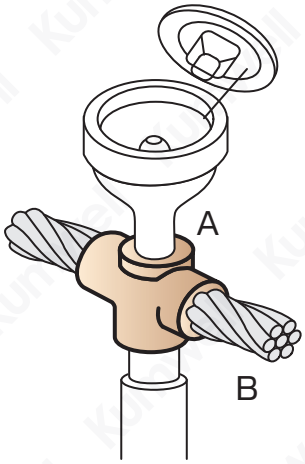
# AC2

## Cable to Grounding Receptacle

Horizontal trru cable to ground receptacle




### For GYSER 663

| Rod Size | Conductor Size | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|---|
| A(mm.) | B(mm²) | | | |
| 12.7 | 35 | KW115 | AC2-C-12735663 | HCC00 |
| | 50 | KW115 | AC2-C-12750663 | HCC00 |
| | 70 | KW115 | AC2-C-12770663 | HCC00 |
| | 95 | KW150 | AC2-C-12795663 | HCC00 |
| | 120 | KW150 | AC2-C-127120663 | HCC00 |

### For GYSER 993

| Rod Size | Conductor Size | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|---|
| A(mm.) | B(mm²) | | | |
| 12.7 | 35 | KW115 | AC2-C-12735993 | HCC00 |
| | 50 | KW115 | AC2-C-12750993 | HCC00 |
| | 70 | KW115 | AC2-C-12770993 | HCC00 |
| | 95 | KW150 | AC2-C-12795993 | HCC00 |
| | 120 | KW150 | AC2-C-127120993 | HCC00 |

### Equipment



| Mold | Metal powder |
|---|---|
| Handle clamp | Steel disk |

### Necessary Tools



| Mold brush | Cable clean brush | File |
|---|---|---|
| Flint igniter | Scraper | Tool box |

### Recommended Tools

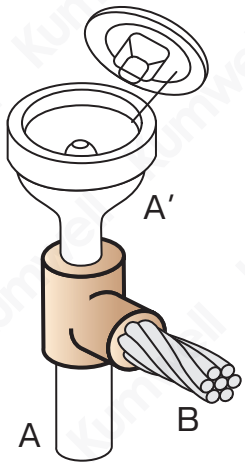
- Butane torch
- Butane gas
- Gloves

Note: Special requirement can be requested.

# ACR1

## Cable and Grounding Receptacle to Ground Rod

Horizontal cable and ground receptacle to the top of ground rod




### Equipment




### Necessary Tools




### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### For GYSER 663

| Rod Size | | | Conductor Size | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|---|---|---|
| A(mm.) | A(inch) | A'(mm.) | B(mm²) | | | |
| 14.2 | 5/8 | 12.7 | 50 | KW200x2 | ACR1-J-14212750663 | HCD00 |
| | | | 70 | KW200x2 | ACR1-J-14212770663 | HCD00 |
| | | | 95 | KW200x2 | ACR1-J-14212795663 | HCD00 |
| | | | 120 | KW200x2 | ACR1-J-142127120663 | HCD00 |
| 17.2 | 3/4 | 12.7 | 50 | KW200x2 | ACR1-J-17212750663 | HCD00 |
| | | | 70 | KW200x2 | ACR1-J-17212770663 | HCD00 |
| | | | 95 | KW200x2 | ACR1-J-17212795663 | HCD00 |
| | | | 120 | KW200x2 | ACR1-J-172127120663 | HCD00 |
| 23.1 | 1 | 12.7 | 50 | KW250x2 | ACR1-J-23112750663 | HCD00 |
| | | | 70 | KW250x2 | ACR1-J-23112770663 | HCD00 |
| | | | 95 | KW250x2 | ACR1-J-23112795663 | HCD00 |
| | | | 120 | KW250x2 | ACR1-J-231127120663 | HCD00 |

### For GYSER 993

| Rod Size | | | Conductor Size | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|---|---|---|
| A(mm.) | A(inch) | A'(mm.) | B(mm²) | | | |
| 14.2 | 5/8 | 12.7 | 50 | KW200x2 | ACR1-J-14212750993 | HCD00 |
| | | | 70 | KW200x2 | ACR1-J-14212770993 | HCD00 |
| | | | 95 | KW200x2 | ACR1-J-14212795993 | HCD00 |
| | | | 120 | KW200x2 | ACR1-J-142127120993 | HCD00 |
| 17.2 | 3/4 | 12.7 | 50 | KW200x2 | ACR1-J-17212750993 | HCD00 |
| | | | 70 | KW200x2 | ACR1-J-17212770993 | HCD00 |
| | | | 95 | KW200x2 | ACR1-J-17212795993 | HCD00 |
| | | | 120 | KW200x2 | ACR1-J-172127120993 | HCD00 |
| 23.1 | 1 | 12.7 | 50 | KW250x2 | ACR1-J-23112750993 | HCD00 |
| | | | 70 | KW250x2 | ACR1-J-23112770993 | HCD00 |
| | | | 95 | KW250x2 | ACR1-J-23112795993 | HCD00 |
| | | | 120 | KW250x2 | ACR1-J-231127120993 | HCD00 |

Note: Special requirement can be requested.

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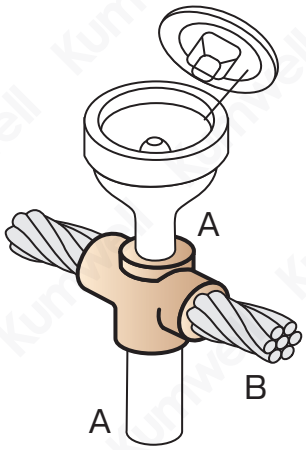
# ACR2

## Cable and Grounding Receptacle to Ground Rod

Horizontal cable thru and ground receptacle to the top of ground rod




### For GYSER 663

| Rod Size | | | Conductor Size | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|---|---|---|
| A(mm.) | A(inch) | A'(mm.) | B(mm²) | | | |
| 14.2 | 5/8 | 12.7 | 50 | KW200x2 | ACR2-J-14212750663 | HCD00 |
| | | | 70 | KW200x2 | ACR2-J-14212770663 | HCD00 |
| | | | 95 | KW200x2 | ACR2-J-14212795663 | HCD00 |
| | | | 120 | KW200x2 | ACR2-J-142127120663 | HCD00 |
| 17.2 | 3/4 | 12.7 | 50 | KW200x2 | ACR2-J-17212750663 | HCD00 |
| | | | 70 | KW200x2 | ACR2-J-17212770663 | HCD00 |
| | | | 95 | KW200x2 | ACR2-J-17212795663 | HCD00 |
| | | | 120 | KW200x2 | ACR2-J-172127120663 | HCD00 |
| 23.1 | 1 | 12.7 | 50 | KW250x2 | ACR2-J-23112750663 | HCD00 |
| | | | 70 | KW250x2 | ACR2-J-23112770663 | HCD00 |
| | | | 95 | KW250x2 | ACR2-J-23112795663 | HCD00 |
| | | | 120 | KW250x2 | ACR2-J-231127120663 | HCD00 |

### Equipment




### For GYSER 993

| Rod Size | | | Conductor Size | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|---|---|---|
| A(mm.) | A(inch) | A'(mm.) | B(mm²) | | | |
| 14.2 | 5/8 | 12.7 | 50 | KW200x2 | ACR2-J-14212750993 | HCD00 |
| | | | 70 | KW200x2 | ACR2-J-14212770993 | HCD00 |
| | | | 95 | KW200x2 | ACR2-J-14212795993 | HCD00 |
| | | | 120 | KW200x2 | ACR2-J-142127120993 | HCD00 |
| 17.2 | 3/4 | 12.7 | 50 | KW200x2 | ACR2-J-17212750993 | HCD00 |
| | | | 70 | KW200x2 | ACR2-J-17212770993 | HCD00 |
| | | | 95 | KW200x2 | ACR2-J-17212795993 | HCD00 |
| | | | 120 | KW200x2 | ACR2-J-172127120993 | HCD00 |
| 23.1 | 1 | 12.7 | 50 | KW250x2 | ACR2-J-23112750993 | HCD00 |
| | | | 70 | KW250x2 | ACR2-J-23112770993 | HCD00 |
| | | | 95 | KW250x2 | ACR2-J-23112795993 | HCD00 |
| | | | 120 | KW250x2 | ACR2-J-231127120993 | HCD00 |

### Necessary Tools




### Recommended Tools

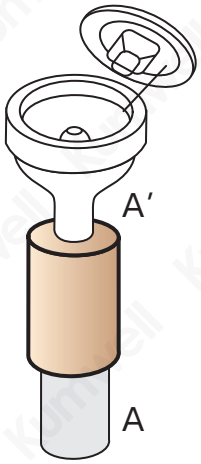
- Butane torch
- Butane gas
- Gloves

Note: Special requirement can be requested.

# AR1

## Grounding Receptacle to Ground Rod

Ground receptacle to the top of ground rod




### For GYSER 663

| Rod Size | | | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|---|---|
| A(mm.) | A(inch) | A'(mm.) | | | |
| 14.2 | 5/8 | 12.7 | KW150x2 | AR1-CL-142663 | HCC00 |
| 17.2 | 3/4 | 12.7 | KW150x2 | AR1-CL-172663 | HCC00 |
| 23.1 | 1 | 12.7 | KW200x2 | AR1-DL-231663 | HCD00 |

### For GYSER 993

| Rod Size | | | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|---|---|
| A(mm.) | A(inch) | A'(mm.) | | | |
| 14.2 | 5/8 | 12.7 | KW150x2 | AR1-CL-142993 | HCC00 |
| 17.2 | 3/4 | 12.7 | KW150x2 | AR1-CL-172993 | HCC00 |
| 23.1 | 1 | 12.7 | KW200x2 | AR1-DL-231993 | HCD00 |

### Equipment



| | |
|---|---|
| Mold | Metal powder |
| Handle clamp | Steel disk |

### Necessary Tools



| | | |
|---|---|---|
| Mold brush | Cable clean brush | File |
| Flint igniter | Scraper | Tool box |

### Recommended Tools

- Butane torch
- Butane gas
- Gloves

Note: Special requirement can be requested.

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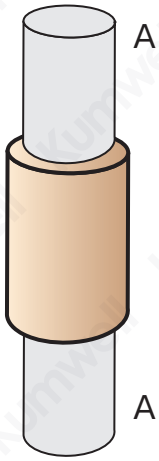
# RR1

## Ground Rod to Ground Rod

Vertical ground rod end to end




| Rod Size | | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|---|
| A(mm.) | A(inch) | | | |
| 12.7 | 1/2 | KW150 | RR1-CL-127127 | HCC00 |
| 14.2 | 5/8 | KW200 | RR1-CL-142142 | HCC00 |
| 17.2 | 3/4 | KW200 | RR1-CL-172172 | HCC00 |
| 23.1 | 1 | KW250 | RR1-CL-231231 | HCC00 |

### Equipment




### Necessary Tools




### Recommended Tools

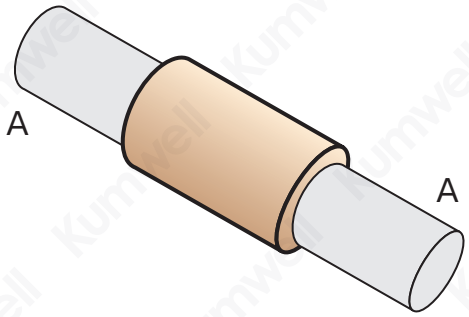
- Butane torch
- Butane gas
- Gloves

Note: Special requirement can be requested.

# RR2

## Ground Rod to Ground Rod

Horizontal ground rod end to end




| Rod Size | | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|---|
| A(mm.) | A(inch) | | | |
| 12.7 | 1/2 | KW150 | RR2-CL-127127 | HCC00 |
| 14.2 | 5/8 | KW200 | RR2-CL-142142 | HCC00 |
| 17.2 | 3/4 | KW200 | RR2-CL-172172 | HCC00 |
| 23.1 | 1 | KW250 | RR2-CL-231231 | HCC00 |

### Equipment

| | |
|---|---|
|  Mold |  Metal powder |
|  Handle clamp |  Steel disk |

### Necessary Tools

| | | |
|---|---|---|
|  Mold brush |  Cable clean brush |  File |
|  Flint igniter |  Scraper |  Tool box |

### Recommended Tools

- Butane torch
- Butane gas
- Gloves

Note: Special requirement can be requested.

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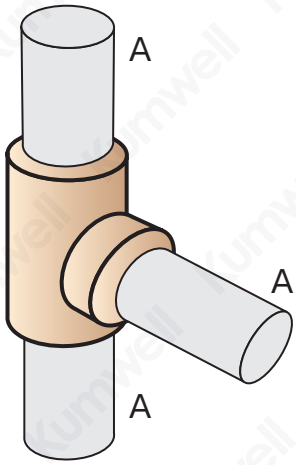
# RR3

## Ground Rod to Ground Rod

Horizontal ground rod tap to vertical ground rod




| Rod Size | | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|---|
| A(mm.) | A(inch) | | | |
| 12.7 | 1/2 | KW200 | RR3-CL-127127 | HCC00 |
| 14.2 | 5/8 | KW200 | RR3-CL-142142 | HCC00 |
| 17.2 | 3/4 | KW250 | RR3-CL-172172 | HCC00 |
| 23.1 | 1 | KW150x2 | RR3-DL-231231 | HCD00 |

### Equipment


Mold


Metal powder


Handle clamp


Steel disk

### Necessary Tools


Mold brush


Cable clean brush


File


Flint igniter


Scraper



Tool box

### Recommended Tools

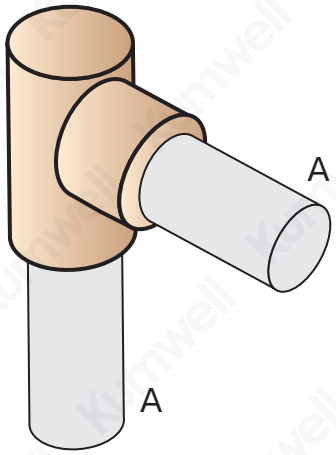
- Butane torch
- Butane gas
- Gloves

Note: Special requirement can be requested.

# RR4

## Ground Rod to Ground Rod

Horizontal ground rod to ground rod




| Rod Size | | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|---|
| A(mm.) | A(inch) | | | |
| 12.7 | 1/2 | KW200 | RR4-C-127127 | HCC00 |
| 14.2 | 5/8 | KW200 | RR4-C-142142 | HCC00 |
| 17.2 | 3/4 | KW250 | RR4-C-172172 | HCC00 |
| 23.1 | 1 | KW150x2 | RR4-D-231231 | HCD00 |

### Equipment

| | |
|---|---|
|  Mold |  Metal powder |
|  Handle clamp |  Steel disk |

### Necessary Tools

| | | |
|---|---|---|
|  Mold brush |  Cable clean brush |  File |
|  Flint igniter |  Scraper |  Tool box |

### Recommended Tools

- Butane torch
- Butane gas
- Gloves

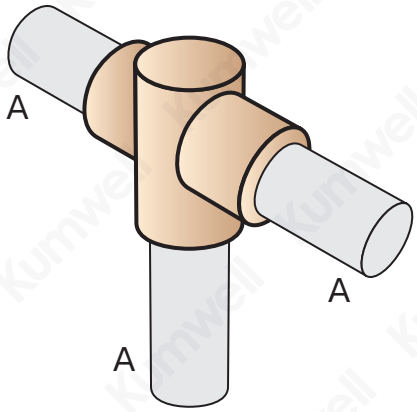
Note: Special requirement can be requested.

Kumwell

# RR5

## Ground Rod to Ground Rod

Horizontal ground rod thru to ground rod




| Rod Size | | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|---|
| A(mm.) | A(inch) | | | |
| 12.7 | 1/2 | KW200 | RR5-C-127127 | HCC00 |
| 14.2 | 5/8 | KW200 | RR5-C-142142 | HCC00 |
| 17.2 | 3/4 | KW250 | RR5-C-172172 | HCC00 |
| 23.1 | 1 | KW150x2 | RR5-D-231231 | HCD00 |

### Equipment



| | |
|---|---|
| Mold | Metal powder |
| Handle clamp | Steel disk |

### Necessary Tools



| | | |
|---|---|---|
| Mold brush | Cable clean brush | File |
| Flint igniter | Scraper | Tool box |

### Recommended Tools

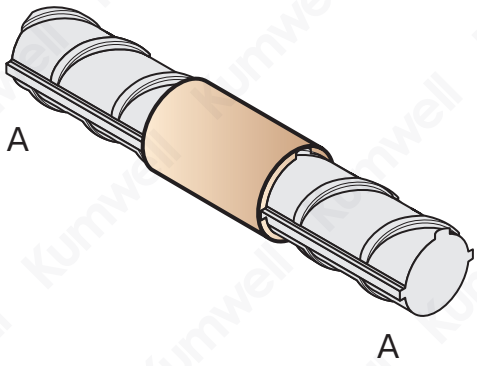
- Butane torch
- Butane gas
- Gloves

Note: Special requirement can be requested.

# RE1

## Rebar to Rebar

Horizontal rebar end to end




| Rod Size A(mm.) | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|
| 10 | KW90 | RE1-C-1010 | HCC00 |
| 12 | KW115 | RE1-C-1212 | HCC00 |
| 16 | KW200 | RE1-C-1616 | HCC00 |
| 20 | KW250 | RE1-C-2020 | HCC00 |
| 25 | KW200x2 | RE1-D-2525 | HCD00 |

### Equipment



| Mold | Metal powder |
|---|---|
| Handle clamp | Steel disk |

### Necessary Tools



| Mold brush | Cable clean brush | File | Ceramic fiber |
|---|---|---|---|
| Flint igniter | Scraper | Tool box | Duct seal |

### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

- For perfect welding, it need to clean and remove oxide and moisture from reinforcement steel and conductor before making connection
- Kumwell RE Mold provides ceramic fiber to prevent leakage

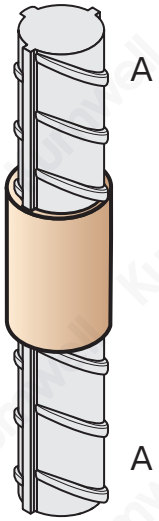
Note: Special requirement can be requested.

Kumwell

# RE2

## Rebar to Rebar

Vertical rebar end to end




| Rod Size A(mm.) | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|
| 10 | KW90 | RE2-CL-1010 | HCC00 |
| 12 | KW115 | RE2-CL-1212 | HCC00 |
| 16 | KW200 | RE2-CL-1616 | HCC00 |
| 20 | KW250 | RE2-CL-2020 | HCC00 |
| 25 | KW200x2 | RE2-DL-2525 | HCD00 |

### Equipment




### Necessary Tools




### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

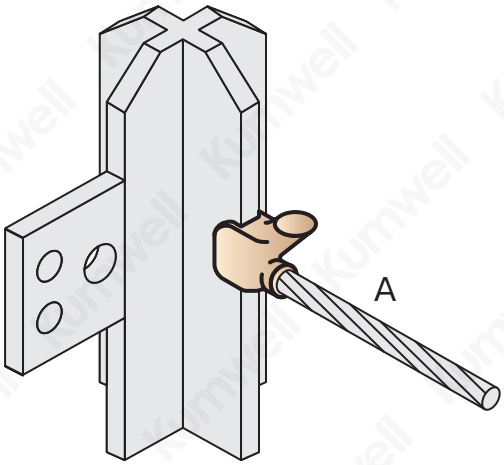
- For perfect welding, it need to clean and remove oxide and moisture from reinforcement steel and conductor before making connection
- Kumwell RE Mold provides ceramic fiber to prevent leakage

Note: Special requirement can be requested.

# SRS1

## Steel Cable to Steel Rod

Vertical steel rod tap to horizontal




| Conductor Size | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|
| A(mm²) | | | |
| 50 | KW45 | SRS1-C-50 | HCC00-X |
| 50 | KW45 | SRS1-C-50S | HCC00-X |

### Equipment



Mold | Metal powder



Handle clamp | Steel disk

### Necessary Tools



Mold brush | Cable clean brush | Busbar brush

Flint igniter | Scraper | Tool box

### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

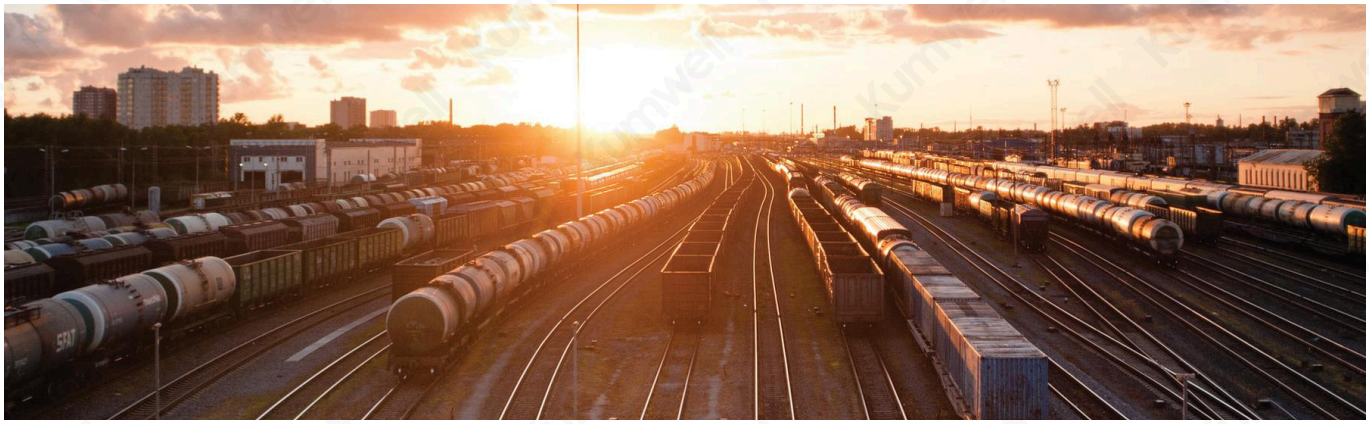
- For perfect connection, Remove oxide and moisture where making connection

Note: Special requirement can be requested.

Kumwell

# KR Weld metal powder

## For Railway



Kumwell KR type's exothermic welding powder for railway signaling is tin free that can prevent metallurgical damage to the rail. Weld material provides a final joint to the average of 43,000 psi tensile strength tested by ASTM E8M (Test Methods for Tension Testing of Metallic Material). KR Type has been complied with the standards of American Railway Engineering and Maintenance-of-way Association (AREMA C&S Manual Recommendation Part 8.1.34)






**Applications**

Suitable for Signaling bond's connections, that is, Horizontal cable end tap to web rail, Horizontal cable end tap to head rail, Stud tap to web rail.

**Standards**

- American Railway Engineering and Maintenance-of-way Association (AREMA C&S Manual Recommendation Part 8.1.34)
- Test Method for Tension Testing of Metallic Material (ASTME8M)

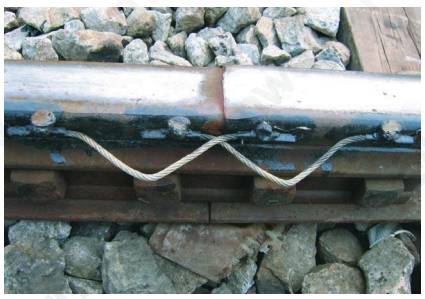
**Storage**

It should be stored in an ambient temperature and avoid moisture.

**Criteria of Test**

Kumwell Exothermic welding connections have been successfully tested in accordance with;

- UL 467 Standard for Grounding & Bonding Equipment/UL Inspection Witness (except yield copper)
- American Railway Engineering and Maintenance-of-way Association (AREMA ASTM E8M) the weld material shall not contain tin and phosphorous or caustic, toxic, or explosive substance.



Signaling cable to head rail



Signaling cable to web rail



Stud to rail

# KR Weld metal powder

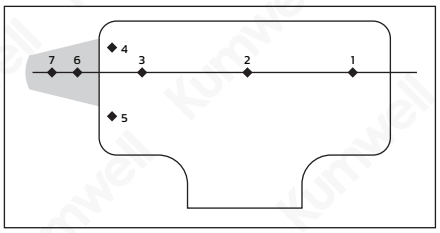
## For Railway

### Quality Assurance

Kumwell is also internationally recognized for high standard graphite mold and the exothermic welding powder from successfully passed the control test in accordance with the UL467 Standard for Grounding and Bonding Equipment/UL Inspection Witness (except yield copper).

### Process

Kumwell Exothermic Welding process is a molecular chemical reaction between copper oxide and aluminum, generating a tremendous superheat with molten metals reaching at high temperatures. The process can be completed itself automatically without external source of power or heat.




| Specimen \ Point | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| Railway Signaling bond | 240 | 245 | 240 | 276 | 287 | 118 | 124 |

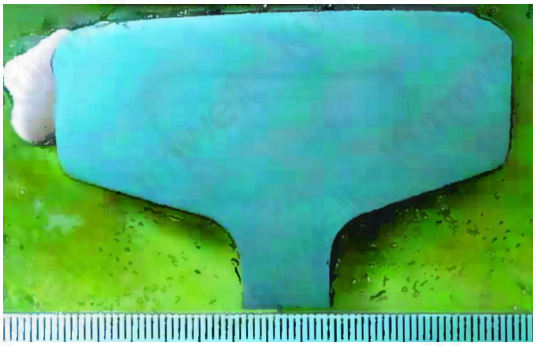
**Hardness survey location of vickers hardness test (HV10) of railway signaling bond**

### Graphite Mold

- Earnest design: cavity, flow path
- High quality raw material
- Accurate tolerance

### Safety starting and weld metal powder

- No Tin and Phosphorus
- Nontoxic and heavy metal
- Non self-ignite
- Ignition temperature at least 400°C
- Smooth reaction
- Steady burn without pop and fire out
- No slag and porosity
- Consistency of color
- High conductivity with at least 93% Cu
- No affect to rail



**Microstructure of a cross-section of exothermic welding for railway signaling bond**

### Packaging

Kumwell weld metal powder is contained a moisture-resistant plastic cartridge, packed in a paper box. Integral weld metal package is identified as to the weld metal powder's amount, type of metal powder to be connected, Lot No., the number of tubes to manufacturing date (MFD).

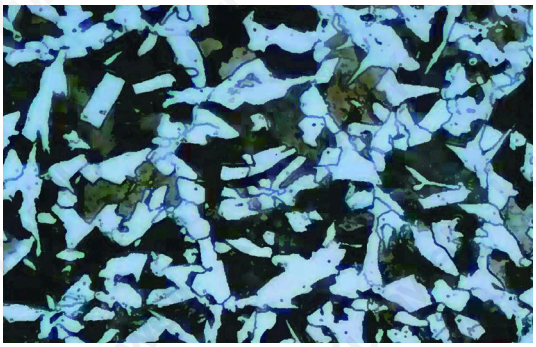
| Code | KR25 | KR32 | KR45 | KR65 | KR90 | KR115 | KR150 | KR200 | KR250 |
|---|---|---|---|---|---|---|---|---|---|
| Tubes/box | 50 | 20 | 20 | 20 | 20 | 10 | 10 | 10 | 10 |

### Storage

It should be stored at ambient temperature and kept away from moisture.

### Heat-Affected Zone (HAZ)

Railway signaling is a system used to control traffic safety, essentially to prevent trains from colliding.
Exothermic welding is one of the most popular methods of railway signaling bond. In welding process, the martensite is formed by rapid cooling, quenching, of autensite which traps carbon atoms that do not have enough time to diffuse out of the crystal structure.
When viewed in cross-section, the lenticular (lens-shaped) crystal grains appear acicular (needle-shaped).
Martensite affect to the rail with increasing risk of cracking and brittle.



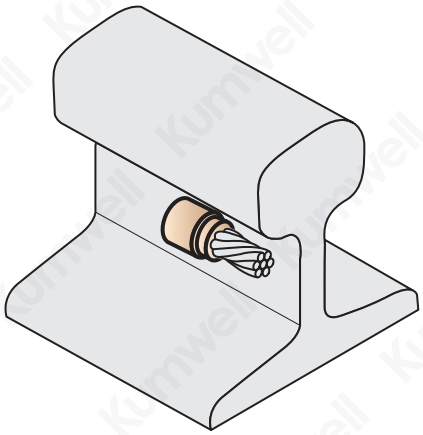
**Macrostructure of a cross-section of exothermic welding for railway signaling bond**

Kumwell

# KWRT(R/L)

## Cable to Web Rail

Horizontal ground rod thru to ground rod



Application for Connection Railway

Suitable for railway signaling cable for rail size 3/16" or 5/16" on web rail completed with graphite mold No. KWRT3R, KWRT3L, KWRT5R, KWRT5L and handle clamp No. HCM00

| Signaling Cable Diameter(inch) | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|
| 3/16 | KR25 | KWRT3R | HCM00 |
| 3/16 | KR25 | KWRT3L | HCM00 |
| 5/16 | KR32 | KWRT5R | HCM00 |
| 5/16 | KR32 | KWRT5L | HCM00 |

### Equipment



Mold | Metal powder

Handle clamp | Steel disk

### Necessary Tools



Mold brush | Cable clean brush | Busbar brush

Flint igniter | Scraper | Tool box

### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

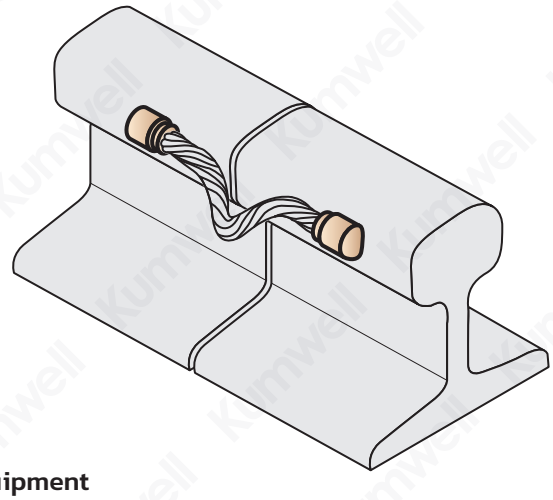
- For perfect connection, Remove oxide and moisture where making connection
- "L" for Left connection "R" for Right connection

Note: Special requirement can be requested.

# KHRT

## Cable to Head Rail

Horizontal cable end tap to head rail



Application for Connection Railway

Suitable for connection railway signaling cable for rail size 3/16"x7/12" or 5/16"x7-1/2" on head rail completed with graphite mold No. KHRT3R, KHRT3L, KHRT5R, KHRT5L and handle clamp No. HCH00

| Signaling Cable | | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|---|
| Diameter (inch) | Length (inch) | | | |
| 3/16 | 7-1/2 | KR25 | KHRT3R | HCH00 |
| 3/16 | 7-1/2 | KR25 | KHRT3L | HCH00 |
| 5/16 | 7-1/2 | KR32 | KHRT5R | HCH00 |
| 5/16 | 7-1/2 | KR32 | KHRT5L | HCH00 |

### Equipment




### Necessary Tools




### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

- For perfect connection, Remove oxide and moisture where making connection
- "L" for Left connection "R" for Right connection

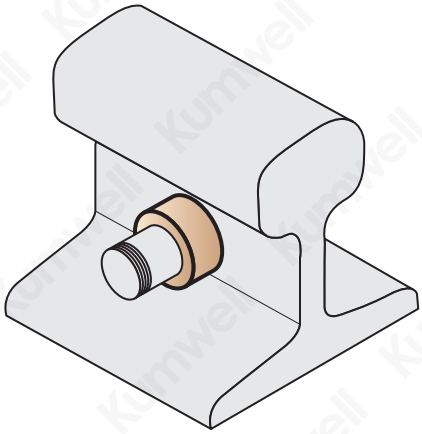
Note: Special requirement can be requested.

Kumwell

# KWS

## Stud to Web Rail

Stud tap to web rail



Application for Connection Railway

Suitable for joint stud tap to web rail completed with handle clamp No. HCW00

| Stud | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|
| M6 | KR45 | KWS6 | HCW00 |
| M8 | KR45 | KWS8 | HCW00 |
| M10 | KR65 | KWS10 | HCW00 |
| M12 | KR90 | KWS12 | HCW00 |
| M16 | KR115 | KWS16 | HCW00 |

### Equipment



| Mold | Metal powder |
|---|---|
| Handle clamp | Steel disk |

### Necessary Tools



| Mold brush | Cable clean brush | Busbar brush |
|---|---|---|
| Flint igniter | Scraper | Tool box |

### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

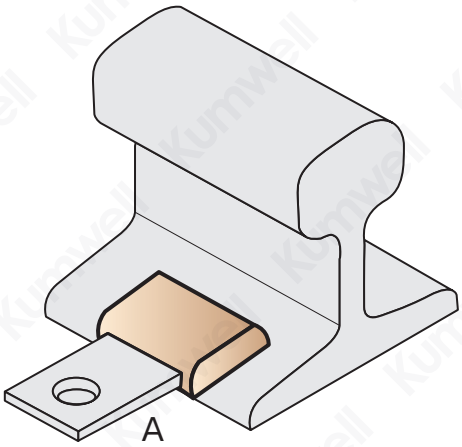
- For perfect connection, Remove oxide and moisture where making connection

Note: Special requirement can be requested.

# BX1

## Busbar to Rail

Bar to foot of rail at angle 90°




| Rod Size A(mmxmm) | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|
| 25x3 | KR65 | BX1-CL-253 | HCF00 |

### Equipment

| | |
|---|---|
|  Mold |  Metal powder |
|  Handle clamp |  Steel disk |

### Necessary Tools

| | | |
|---|---|---|
|  Mold brush |  Busbar brush |  File |
|  Flint igniter |  Scraper |  Tool box |

### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

- For perfect connection, Remove oxide and moisture where making connection

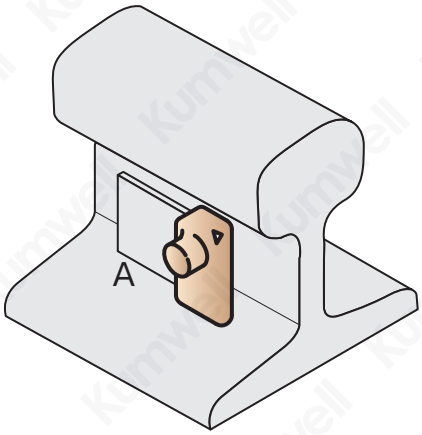
Note: Special requirement can be requested.

Kumwell

# BX3

## Busbar to Rail

Horizontal busbar to web rail




| Conductor A(mmxmm) | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|
| 40x5 | KR150x2 | BX3R-CL-405 | HCW00 |
| 40x5 | KR150x2 | BX3L-CL-405 | HCW00 |
| 40x6 | KR150x2 | BX3R-CL-406 | HCW00 |
| 40x6 | KR150x2 | BX3L-CL-406 | HCW00 |
| 50x6 | KR200x2 | BX3R-DL-506 | HDWC00 |
| 50x6 | KR200x2 | BX3L-DL-506 | HDWC00 |

### Equipment



| Mold | Metal powder |
|---|---|
| Handle clamp | Steel disk |

### Necessary Tools



| Mold brush | Busbar brush | File |
|---|---|---|
| Flint igniter | Scraper | Tool box |

### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

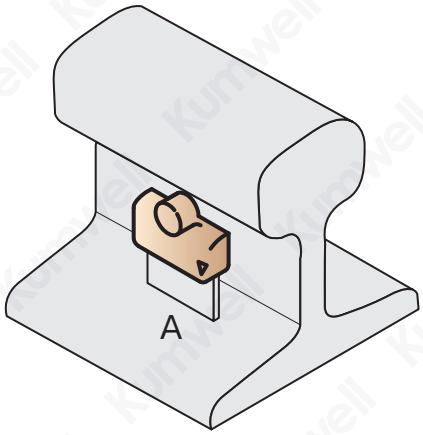
- For perfect connection, Remove oxide and moisture where making connection
- "L" for Left connection "R" for Right connection

Note: Special requirement can be requested.

# BX4

## Busbar to Rail

Horizontal busbar to web rail




| Conductor A(mmxmm) | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|
| 40x5 | KR150x2 | BX4-CL-405 | HCW00 |
| 40x6 | KR150x2 | BX4-CL-406 | HCW00 |
| 50x6 | KR200x2 | BX4-DL-506 | HDW00 |

### Equipment



| Mold | Metal powder |
|---|---|
| Handle clamp | Steel disk |

### Necessary Tools



| Mold brush | Busbar brush | File |
|---|---|---|
| Flint igniter | Scraper | Tool box |

### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

- For perfect connection, Remove oxide and moisture where making connection

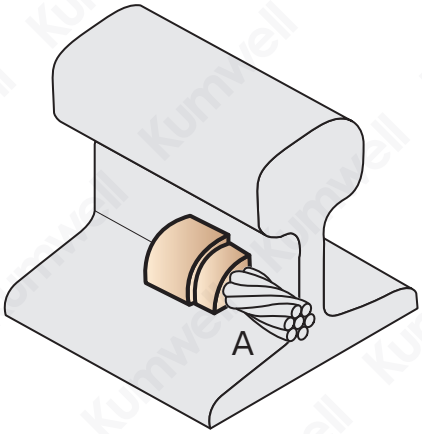
Note: Special requirement can be requested.

Kumwell

# CX1

## Cable to Rail

Horizontal cable to rail termination (fillet)




| Conductor A(mm²) | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|
| 50 | KR115 | CX1L-CL-50 | HCF00 |
| 50 | KR115 | CX1R-CL-50 | HCF00 |
| 70 | KR115 | CX1L-CL-70 | HCF00 |
| 70 | KR115 | CX1R-CL-70 | HCF00 |
| 95 | KR150 | CX1L-CL-95 | HCF00 |
| 95 | KR150 | CX1R-CL-95 | HCF00 |
| 120 | KR150 | CX1L-CL-120 | HCF00 |
| 120 | KR150 | CX1R-CL-120 | HCF00 |
| 150 | KR200 | CX1L-CL-150 | HCF00 |
| 150 | KR200 | CX1R-CL-150 | HCF00 |
| 185 | KR200 | CX1L-CL-185 | HCF00 |
| 185 | KR200 | CX1R-CL-185 | HCF00 |
| 240 | KR200 | CX1L-CL-240 | HCF00 |
| 240 | KR200 | CX1R-CL-240 | HCF00 |

### Equipment


Mold


Metal powder


Handle clamp


Steel disk

### Necessary Tools


Mold brush


Cable clean brush


Busbar brush


Flint igniter


Scraper



Tool box

### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

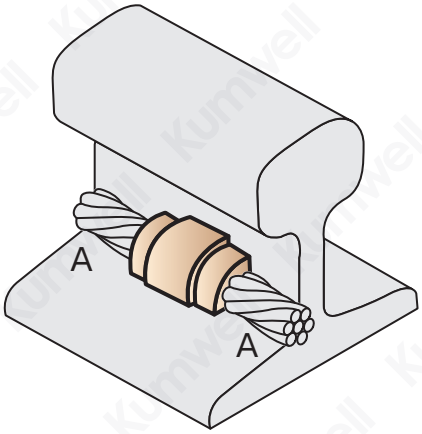
- For perfect connection, Remove oxide and moisture where making connection
- "L" for Left connection "R" for Right connection

Note: Special requirement can be requested.

# CX2

## Cable to Rail

Horizontal thru cable to rail termination (Fillet)




| Conductor A(mm²) | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|
| 50 | KR150 | CX2-CL-50 | HCF00 |
| 70 | KR150 | CX2-CL-70 | HCF00 |
| 95 | KR200 | CX2-CL-95 | HCF00 |
| 120 | KR200 | CX2-CL-120 | HCF00 |
| 150 | KR250 | CX2-CL-150 | HCF00 |

### Equipment




### Necessary Tools




### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

- For perfect connection, Remove oxide and moisture where making connection

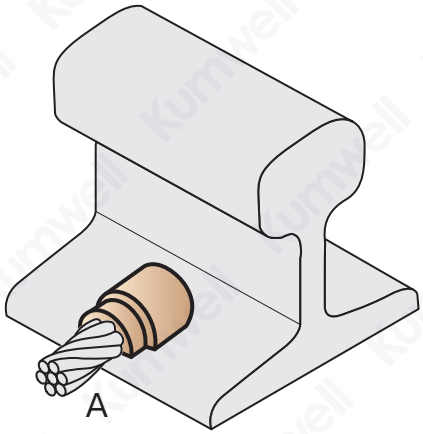
Note: Special requirement can be requested.

Kumwell

# CX5

## Cable to Rail

Horizontal cable end tap to rail (foot)




| Conductor A(mm²) | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|
| 16 | KR25 | CX5-A-16 | **HCA00 |
| 25 | KR25 | CX5-A-25 | **HCA00 |
| 35 | KR32 | CX5-A-35 | **HCA00 |
| 50 | KR32 | CX5-A-50 | **HCA00 |
| 70 | KR65 | CX5-A-70 | **HCA00 |
| 95 | KR65 | CX5-CL-95 | HCF00 |
| 120 | KR90 | CX5-CL-120 | HCF00 |
| 150 | KR115 | CX5-CL-150 | HCF00 |

### Equipment




### Necessary Tools




### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

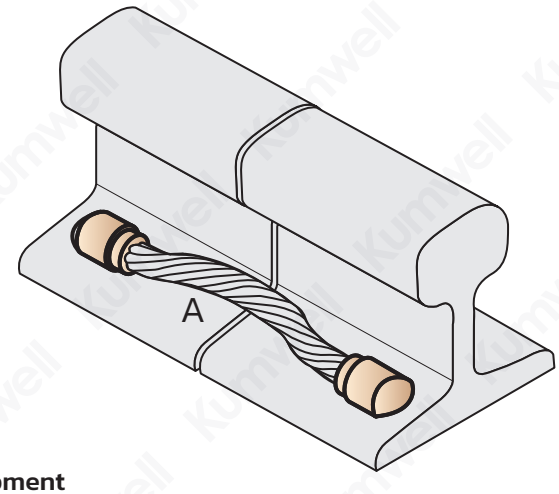
- "**HCA00" Handle clamp type A is completely assembled with the mold
- For perfect connection, Remove oxide and moisture where making connection

Note: Special requirement can be requested.

# CX7

## Cable to Rail

Bond to base of rail (foot)




| Conductor A(mm²) | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|
| 50 | KR45 | CX7L-CL-50 | HCF00 |
| 50 | KR45 | CX7R-CL-50 | HCF00 |
| 70 | KR45 | CX7L-CL-70 | HCF00 |
| 70 | KR45 | CX7R-CL-70 | HCF00 |
| 120 | KR65 | CX7L-CL-120 | HCF00 |
| 120 | KR65 | CX7R-CL-120 | HCF00 |
| 150 | KR90 | CX7L-CL-150 | HCF00 |
| 150 | KR90 | CX7R-CL-150 | HCF00 |

### Equipment




### Necessary Tools




### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

- For perfect connection, Remove oxide and moisture where making connection
- "L" for Left connection "R" for Right connection

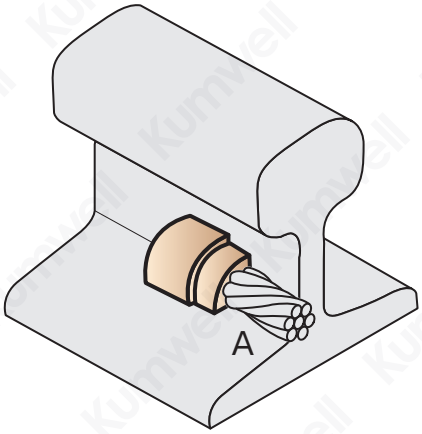
Note: Special requirement can be requested.

Kumwell

# CX8

## Cable to Rail

Horizontal cable end tap to web rail




| Conductor A(mm²) | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|
| 25 | KR25 | CX8R-BL-25 | HCM00 |
| 25 | KR25 | CX8L-BL-25 | HCM00 |
| 35 | KR45 | CX8R-CL-35 | HCW00 |
| 35 | KR45 | CX8L-CL-35 | HCW00 |
| 50 | KR45 | CX8R-CL-50 | HCW00 |
| 50 | KR45 | CX8L-CL-50 | HCW00 |
| 70 | KR45 | CX8R-CL-70 | HCW00 |
| 70 | KR45 | CX8L-CL-70 | HCW00 |
| 95 | KR90 | CX8R-CL-95 | HCW00 |
| 95 | KR90 | CX8L-CL-95 | HCW00 |
| 120 | KR115 | CX8R-CL-120 | HCW00 |
| 120 | KR115 | CX8L-CL-120 | HCW00 |
| 150 | KR150 | CX8R-CL-150 | HCW00 |
| 150 | KR150 | CX8L-CL-150 | HCW00 |
| 185 | KR200 | CX8R-CL-185 | HCW00 |
| 185 | KR200 | CX8L-CL-185 | HCW00 |
| 240 | KR200 | CX8R-CL-240 | HCW00 |
| 240 | KR200 | CX8L-CL-240 | HCW00 |

### Equipment


Mold


Metal powder


Handle clamp


Steel disk

### Necessary Tools


Mold brush


Cable clean brush


Busbar brush


Flint igniter


Scraper



Tool box

### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

- For perfect connection, Remove oxide and moisture where making connection
- "L" for Left connection "R" for Right connection

Note: Special requirement can be requested.

# Conductors
Exothermic Welding

## Cadmium Bronze Wire with Tin Plating for Rail Head Bond



| Code No. | Length (inch) | Overall Diameter (inch) |
|---|---|---|
| KWSBS 37.5 | 7-1/2" | 3/16" |

**Material**
Sinaling wire - Cadmium bronze with tin
Sleeves - Copper

## Cadmium Bronze Wire with Tin Plating for Switch Bond



| Code No. | Length (inch) | Overall Diameter (inch) |
|---|---|---|
| KSBTBS 318T | 18" | 3/16" |

**Material**
Sinaling wire - Cadmium bronze with tin
Sleeves - Copper

## Cadmium Bronze Wire with Tin Plating for Jumper Bond



| Code No. | Length (inch) | Overall Diameter (inch) |
|---|---|---|
| KSBTBJ 318T | 18" | 3/16" |

**Material**
Sinaling wire - Cadmium bronze with tin
Sleeves - Copper

## Cadmium Bronze Wire with Tin Plating for Web Bond



| Code No. | Length (inch) | Overall Diameter (inch) |
|---|---|---|
| KSBW 34T | 4-1/8" | 3/16" |

**Material**
Sinaling wire - Cadmium bronze with tin
Sleeves - Copper
Lug - Copper with tin

## Cadmium Bronze Wire with Tin Plating



| Code No. | Length (inch) | Overall Diameter (inch) |
|---|---|---|
| SB3T | On Request | 3/16" |

**Material**
Sinaling wire - Cadmium bronze with tin

## PVC Covered Galvanized Steel Wire



| Code No. | Length (inch) | Overall Diameter (inch) |
|---|---|---|
| KWBTG 4-0 | 100 | 3/16" |

**Material**
Sinaling wire - Galvanized Steel Ø 4 mm.
PVC Cover - Orange PVC UV Stabiliser

Kumwell

# KB Weld metal powder

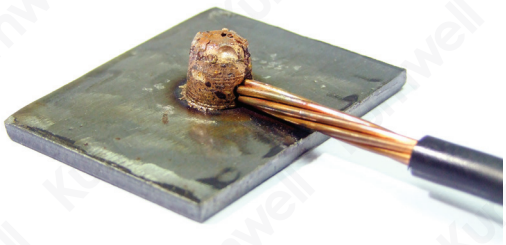
## For Cathodic Protection



Kumwell KB type's exothermic welding process for cable to piping's steel surface provides perfect connections with corrosion resistance and no effect in welding process on pipeline such as martensite at Heat-Affected Zone (Haz). High conductivity of high copper composition withstands repeated fault current without loosening up.

**Applications**

Suitable for Cathodic Protection's connections, that is, Horizontal through cable to horizontal pipe, Angular cable drop to vertical pipe surface.



**Standards**

- ANSI/ASME B 31.4 Pipeline Translation System for Liquid.
- ANSI/ASME B 31.8 Gas Transmission and Distribution Piping System.

**Criteria of Test**

Kumwell Exothermic welding connections have been successfully tested in accordance with;

- UL 467 Standard for Grounding & Bonding Equipment/UL Inspection Witness (except yield copper)






**Quality Assurance**

Kumwell is also internationally recognized for high standard graphite mold and the exothermic welding powder from successfully passed the control test in accordance with the UL467 Standard for Grounding and Bonding Equipment/UL Inspection Witness (except yield copper).

**Process**

Kumwell Exothermic Welding process is a molecular chemical reaction between copper oxide and aluminum, generating a tremendous superheat with molten metals reaching at high temperatures. The process can be completed itself automatically without external source of power or heat.



# KB Weld metal powder

## For Cathodic Protection

**Graphite Mold**
- Earnest design: cavity, flow path
- High quality raw material
- Accurate tolerance

**Safety starting and weld metal powder**
- No Tin and Phosphorus
- Nontoxic and heavy metal
- Non self-ignite
- Ignition temperature at least 400°C
- Smooth reaction
- Steady burn without pop and fire out
- No slag and porosity
- Consistency of color
- High conductivity with at least 93% Cu

**Packaging**

Kumwell weld metal powder contains a moisture-resistant plastic cartridge, packed in a paper box. Integral weld metal package is identified as to the weld metal powder's amount, type of metal powder to be connected, Lot No., the number

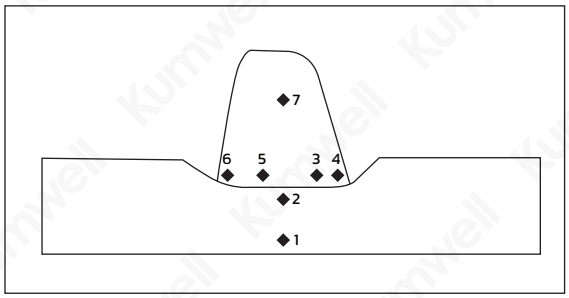
| Code | KB15 | KB25 | KB32 | KB45 | KB65 |
|---|---|---|---|---|---|
| Tubes/box | 40 | 20 | 20 | 20 | 20 |

**Storage**

It should be stored at ambient temperature and kept away from moisture.

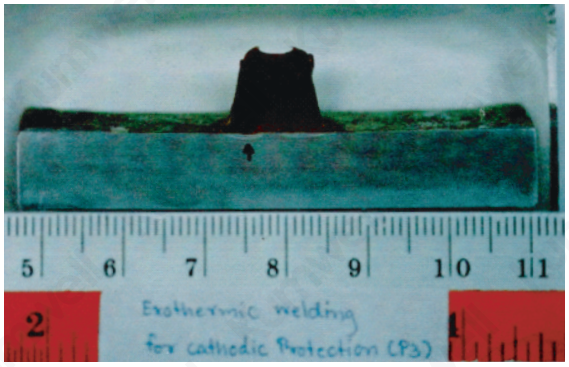
**Heat-Affected Zone (HAZ)**

Cathodic Protection is a method for controlling the corrosion deterioration of metallic structures in contact with most forms of electrolytically conducting environments such as soils, seawater and basically all natural waters. Cathodic Protection has grown to have many uses in marine and underground structures, water storage tanks, gas pipelines, oil platform supports, and many other facilities exposed to a corrosive environment. In welding process, we shall ensure that there is no effect to welding area in term of inside pressure and martensite, which is formed by rapid cooling, quenching, of austenite can be affected to the pipe with increasing risk of penetration.

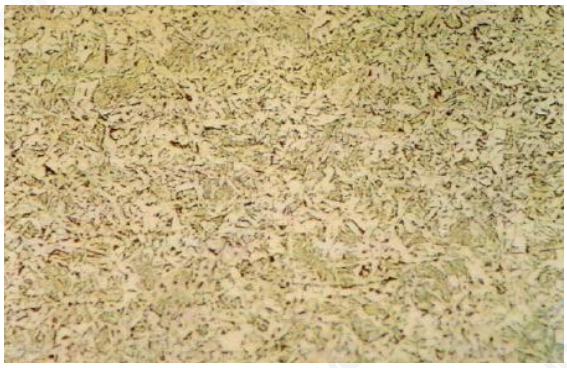



| Specimen \ Point | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| Cathodic protection | 147 | 145 | 173 | 150 | 164 | 153 | 121 |

**Hardness survey location of vickers hardness test (HV10) of cathodic protection**




**Microstructure of a cross-section of exothermic welding for cathodic protection**



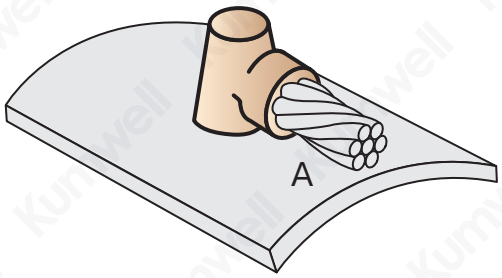
**Macrostructure of a cross-section of exothermic welding for cathodic protection**

Kumwell

# CA1

## Cathodic Protection

Horizontal thru cable to horizontal pipe




| Conductor A(mm²) | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|
| 2.5 | KB15 | CA1-A-2.5 | HCA00 |
| 4 | KB15 | CA1-A-4 | HCA00 |
| 6 | KB15 | CA1-A-6 | HCA00 |
| 10 | KB15 | CA1-A-10 | HCA00 |
| 16 | KB15 | CA1-A-16 | HCA00 |
| 25 | KB15 | CA1-A-25 | HCA00 |
| 35 | KB32 | CA1-A-35 | HCA00 |
| 50 | KB65 | CA1-A-50 | HCA00 |
| 70 | KB65 | CA1-A-70 | HCA00 |

### Equipment




Mold



Metal powder



Steel disk

### Necessary Tools



Mold brush



Cable clean brush



Busbar brush



Flint igniter



Scraper




Tool box

### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

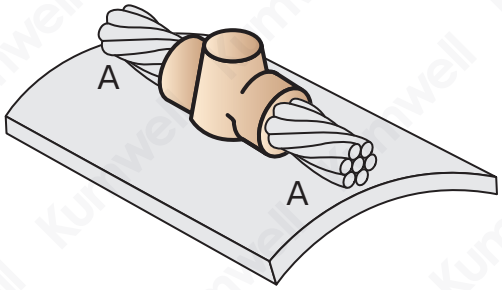
- For perfect connection, Remove oxide and moisture where making connection coat surfaces of steel and connection by rust-oleum cold galvanizing
- KB weld metal powder is special design for cathodic protection
- "HCA00" Type A-Handle clamp is builted-in graphite mold

Note: Special requirement can be requested.

# CA2

## Cathodic Protection

Horizontal thru cable to horizontal pipe




| Conductor A(mm²) | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|
| 2.5 | KB25 | CA2-A-2.5 | HCA00 |
| 4 | KB25 | CA2-A-4 | HCA00 |
| 6 | KB25 | CA2-A-6 | HCA00 |
| 10 | KB25 | CA2-A-10 | HCA00 |
| 16 | KB25 | CA2-A-16 | HCA00 |
| 25 | KB25 | CA2-A-25 | HCA00 |
| 35 | KB45 | CA2-A-35 | HCA00 |
| 50 | KB65 | CA2-A-50 | HCA00 |
| 70 | KB65 | CA2-A-70 | HCA00 |

### Equipment




Mold



Metal powder



Steel disk

### Necessary Tools



Mold brush



Cable clean brush



Busbar brush



Flint igniter



Scraper




Tool box

### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

- For perfect connection, Remove oxide and moisture where making connection coat surfaces of steel and connection by rust-oleum cold galvanizing
- KB weld metal powder is special design for cathodic protection
- "HCA00" Type A-Handle clamp is builted-in graphite mold

Note: Special requirement can be requested.

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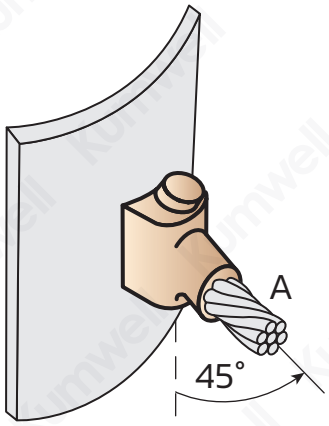
# CA3

## Cathodic Protection

Angular cable drop to vertical pipe surface




| Conductor A(mm²) | Metal Powder | Graphite Mold Type | Handle Clamp Type |
|---|---|---|---|
| 2.5 | KB15 | CA3-B-2.5 | HCB00-XB |
| 4 | KB15 | CA3-B-4 | HCB00-XB |
| 6 | KB15 | CA3-B-6 | HCB00-XB |
| 10 | KB15 | CA3-B-10 | HCB00-XB |
| 16 | KB15 | CA3-B-16 | HCB00-XB |
| 25 | KB15 | CA3-B-25 | HCB00-XB |
| 35 | KB32 | CA3-B-35 | HCB00-XB |
| 50 | KB65 | CA3-B-50 | HCB00-XB |
| 70 | KB65 | CA3-B-70 | HCB00-XB |

### Equipment




### Necessary Tools




### Recommended Tools

- Butane torch
- Butane gas
- Gloves

### Note

- For perfect connection, Remove oxide and moisture where making connection coat surfaces of steel and connection by rust-oleum cold galvanizing
- KB weld metal powder is special design for cathodic protection

Note: Special requirement can be requested.

# One Time

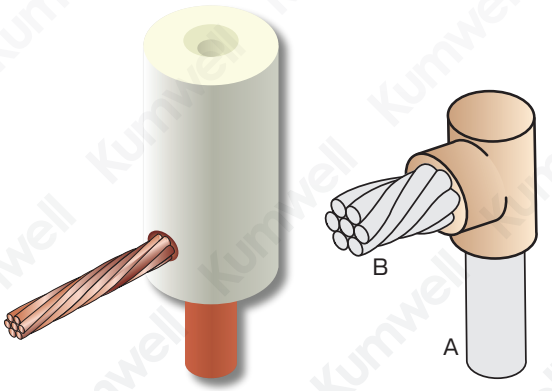
## One Time System

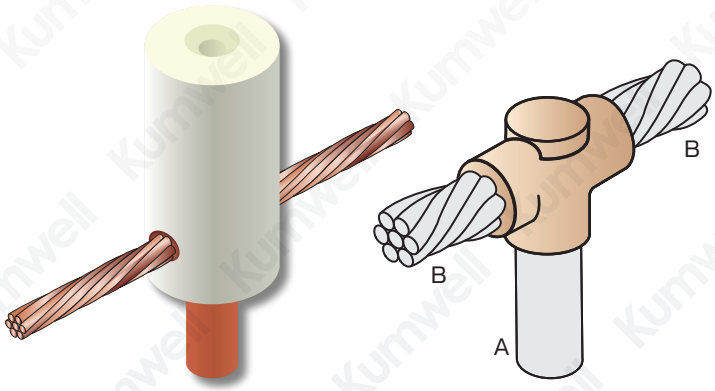
Solution for simplicity and savings




"One Time kit" is a connection of exothermic welding process for grounding and lightning protection system that can be used only one exothermic welding joint. 1-set of "One Time kit" consists of a white ceramic cylindrical shape mold with "slip" (to hold the wires to avoid splitting during the exothermic welding process), weld metal powder, steel disk.

This exothermic welding single use "One Time kit" is friendly use and safety providing because the kit offers less equipment, ready-to-use, easily and safely for installation with reasonable price. Moreover, the welding powder of the product kit excludes any toxic or poison substances, users can ensure that the kit is harmless for the body and health. Our "One Time kit" therefore provides the best solutions of grounding and lightning protection system.



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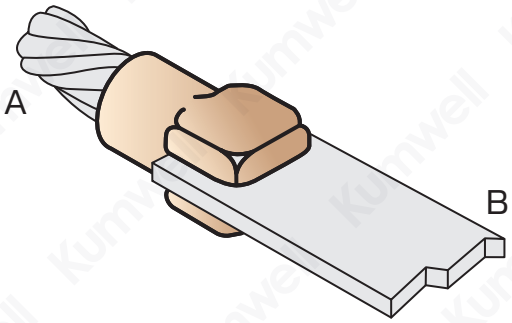
# CB1

## Cable to Bus Bar

One time unit cable to bar




| Conductor Size | | Code |
|---|---|---|
| A(mm²) | B(mmxmm) | |
| 16 | 25x3 | CB135-16 |
| 25 | 25x3 | CB135-25 |
| 35 | 25x3 | CB135-35 |
| 50 | 25x3 | CB150-50 |
| 70 | 25x3 | CB1120-70 |
| 95 | 25x3 | CB1120-95 |
| 120 | 25x3 | CB1120-120 |
| 150 | 25x3 | CB1150-150 |
| 185 | 25x3 | CB1150-185 |
| 240 | 25x3 | CB1300-240 |

### Equipment


One Time


Metal powder

Steel disk

### Necessary Tools


Cable clean brush

Bus bar brush

Flint igniter

### Recommended Tools

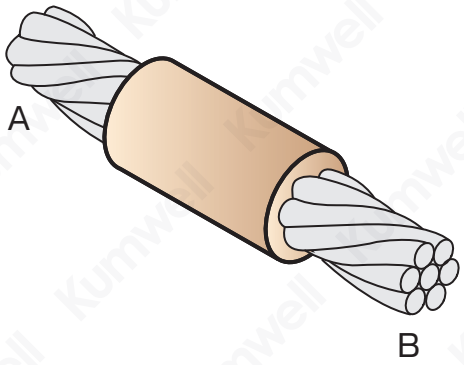
- Butane torch
- Butane gas
- Gloves

Note: Special requirement can be requested.

# CC2

## Cable to Cable

One time unit two way cable

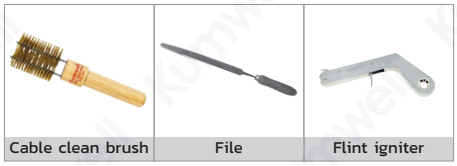



| Conductor Size | | Code |
|---|---|---|
| A(mm²) | B(mm²) | |
| 10 | 10 | CC235-10 |
| 16 | 16 | CC235-16 |
| 25 | 25 | CC235-25 |
| 35 | 35 | CC235-35 |
| 50 | 50 | CC250-50 |
| 70 | 70 | CC2120-70 |
| 70 | 16 | CC2120-70/16 |
| 70 | 25 | CC2120-70/25 |
| 70 | 35 | CC2120-70/35 |
| 70 | 50 | CC2120-70/50 |
| 95 | 95 | CC2120-95 |
| 95 | 16 | CC2120-95/16 |
| 95 | 50 | CC2120-95/50 |
| 95 | 70 | CC2120-95/70 |
| 120 | 120 | CC2120-120 |
| 120 | 70 | CC2120-120/70 |
| 150 | 150 | CC2185-150 |
| 185 | 185 | CC2185-185 |
| 185 | 150 | CC2185-185/150 |
| 185 | 70 | CC2185-185/70 |
| 185 | 95 | CC2185-185/95 |
| 240 | 240 | CC2300-240 |
| 240 | 70 | CC2300-240/70 |

### Equipment




### Necessary Tools




### Recommended Tools

- Butane torch
- Butane gas
- Gloves

Note: Special requirement can be requested.

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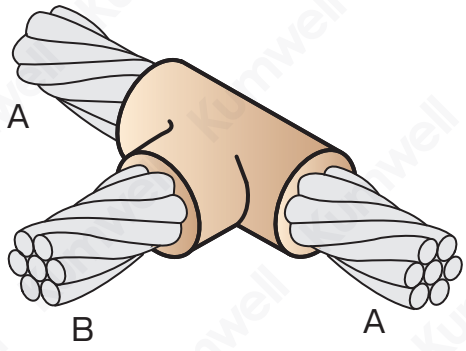
# CC3

## Cable to Cable

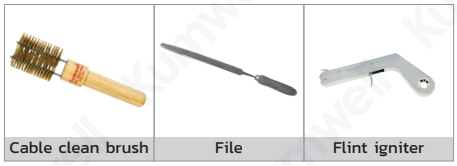
One time unit three way cable




### Equipment




### Necessary Tools




### Recommended Tools

- Butane torch
- Butane gas
- Gloves

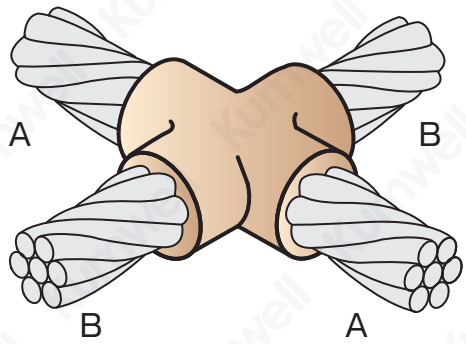
| Conductor Size | | Code |
|---|---|---|
| A(mm²) | B(mm²) | |
| 10 | 10 | CC335-10 |
| 10 | 4 | CC335-10/4 |
| 16 | 16 | CC335-16 |
| 16 | 50 | CC335-16/50 |
| 25 | 25 | CC335-25 |
| 35 | 35 | CC335-35 |
| 50 | 50 | CC350-50 |
| 50 | 16 | CC350-50/16 |
| 50 | 25 | CC350-50/25 |
| 50 | 35 | CC350-50/35 |
| 50 | 6 | CC350-50/6 |
| 25 | 70 | CC3120-25/70 |
| 35 | 120 | CC3120-35/120 |
| 50 | 70 | CC3120-50/70 |
| 50 | 95 | CC3120-50/95 |
| 50 | 120 | CC3120-50/120 |
| 70 | 70 | CC3120-70 |
| 70 | 10 | CC3120-70/10 |
| 70 | 120 | CC3120-70/120 |
| 70 | 16 | CC3120-70/16 |
| 70 | 25 | CC3120-70/25 |
| 70 | 35 | CC3120-70/35 |
| 70 | 50 | CC3120-70/50 |
| 70 | 95 | CC3120-70/95 |
| 95 | 95 | CC3120-95 |
| 95 | 4 | CC3120-95/4 |
| 95 | 6 | CC3120-95/6 |
| 95 | 10 | CC3120-95/10 |
| 95 | 16 | CC3120-95/16 |
| 95 | 25 | CC3120-95/25 |
| 95 | 35 | CC3120-95/35 |
| 95 | 50 | CC3120-95/50 |
| 95 | 70 | CC3120-95/70 |
| 95 | 120 | CC3120-95/120 |
| 120 | 120 | CC3120-120 |
| 120 | 16 | CC3120-120/16 |
| 120 | 35 | CC3120-120/35 |
| 120 | 50 | CC3120-120/50 |
| 120 | 70 | CC3120-120/70 |
| 120 | 95 | CC3120-120/95 |
| 150 | 150 | CC3185-150 |
| 150 | 25 | CC3185-150/25 |
| 150 | 35 | CC3185-150/35 |
| 150 | 50 | CC3185-150/50 |
| 150 | 70 | CC3185-150/70 |
| 150 | 95 | CC3185-150/95 |
| 185 | 185 | CC3185-185 |
| 185 | 50 | CC3185-185/50 |
| 185 | 95 | CC3185-185/95 |
| 50 | 185 | CC3185-50/185 |
| 50 | 240 | CC3300-50/240 |
| 70 | 240 | CC3300-70/240 |
| 120 | 240 | CC3300-120/240 |
| 240 | 240 | CC3300-240 |
| 240 | 35 | CC3300-240/35 |
| 240 | 70 | CC3300-240/70 |
| 240 | 95 | CC3300-240/95 |

Note: Special requirement can be requested.

# CC4

## Cable to Cable

One time unit four way cable

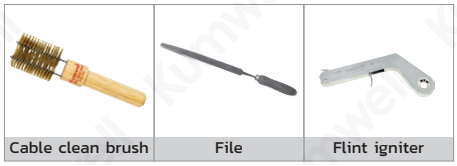



| Conductor Size | | Code |
|---|---|---|
| A(mm²) | B(mm²) | |
| 10 | 10 | CC435-10 |
| 16 | 16 | CC435-16 |
| 25 | 25 | CC435-25 |
| 35 | 35 | CC435-35 |
| 50 | 16 | CC435-50/16 |
| 50 | 50 | CC470-50 |
| 50 | 16 | CC470-50/16 |
| 50 | 25 | CC470-50/25 |
| 50 | 35 | CC470-50/35 |
| 50 | 70 | CC470-50/70 |
| 70 | 70 | CC470-70 |
| 70 | 16 | CC470-70/16 |
| 70 | 35 | CC470-70/35 |
| 70 | 50 | CC470-70/50 |
| 95 | 95 | CC4150-95 |
| 95 | 16 | CC4150-95/16 |
| 95 | 35 | CC4150-95/35 |
| 95 | 50 | CC4150-95/50 |
| 95 | 70 | CC4150-95/70 |
| 120 | 120 | CC4150-120 |
| 120 | 50 | CC4150-120/50 |
| 120 | 70 | CC4150-120/70 |
| 120 | 95 | CC4150-120/95 |
| 150 | 150 | CC4150-150 |
| 150 | 50 | CC4150-150/50 |
| 150 | 70 | CC4150-150/70 |
| 150 | 185 | CC4300-150/185 |
| 150 | 240 | CC4300-150/240 |
| 185 | 185 | CC4300-185 |
| 185 | 70 | CC4300-185/70 |
| 185 | 95 | CC4300-185/95 |
| 240 | 240 | CC4300-240 |
| 240 | 70 | CC4300-240/70 |
| 240 | 95 | CC4300-240/95 |

### Equipment




### Necessary Tools




### Recommended Tools

- Butane torch
- Butane gas
- Gloves

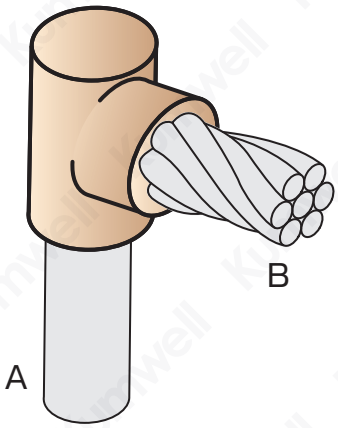
Note: Special requirement can be requested.

Kumwell

# CR1

## Cable to Ground Rod

One time unit one way cable to ground rod

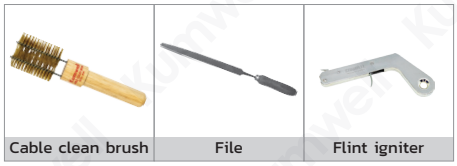



| Rod Size | | Conductor Size | Code |
|---|---|---|---|
| A(mm) | A(inch) | B(mm²) | |
| 14.2 | 5/8 | 6 | CR135-6 |
| | | 10 | CR135-10 |
| | | 16 | CR135-16 |
| | | 25 | CR135-25 |
| | | 35 | CR135-35 |
| | | 50 | CR150-50 |
| | | 70 | CR1120-70 |
| | | 95 | CR1120-95 |
| | | 120 | CR1120-120 |
| | | 150 | CR1185-150 |
| | | 185 | CR1185-185 |
| | | 240 | CR1300-240 |
| 17.2 | 3/4 | 10 | CR135-10-3/4 |
| | | 16 | CR135-16-3/4 |
| | | 25 | CR135-25-3/4 |
| | | 35 | CR135-35-3/4 |
| | | 50 | CR150-50-3/4 |
| | | 70 | CR1120-70-3/4 |
| | | 95 | CR1120-95-3/4 |
| | | 120 | CR1120-120-3/4 |
| | | 150 | CR1185-150-3/4 |
| | | 185 | CR1185-185-3/4 |
| | | 240 | CR1300-240-3/4 |

### Equipment




### Necessary Tools




### Recommended Tools

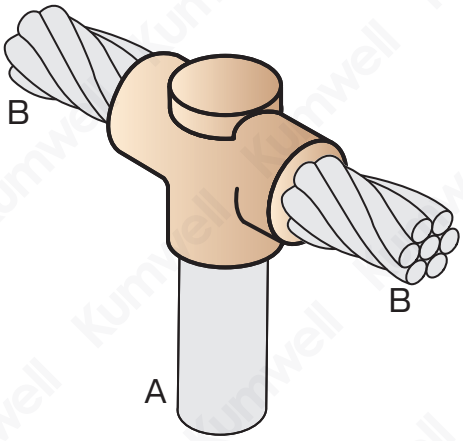
- Butane torch
- Butane gas
- Gloves

Note: Special requirement can be requested.

# CR2

## Cable to Ground Rod

One time unit two way cable to ground rod

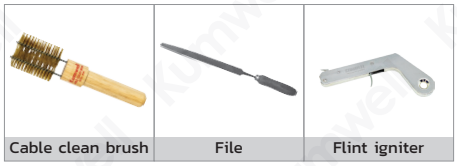



| Rod Size | | Conductor Size | | Code |
|---|---|---|---|---|
| A(mm) | A(inch) | B(mm²) | C(mm²) | |
| 14.2 | 5/8 | 6 | 6 | CR235-6 |
| | | 10 | 10 | CR235-10 |
| | | 16 | 16 | CR235-16 |
| | | 25 | 25 | CR235-25 |
| | | 35 | 35 | CR235-35 |
| | | 50 | 50 | CR250-50 |
| | | 70 | 70 | CR2120-70 |
| | | 70 | 16 | CR2120-70/16 |
| | | 95 | 95 | CR2120-95 |
| | | 95 | 25 | CR2120-95/25 |
| | | 95 | 50 | CR2120-95/50 |
| | | 95 | 70 | CR2120-95/70 |
| | | 120 | 120 | CR2120-120 |
| | | 150 | 150 | CR2185-150 |
| | | 185 | 185 | CR2185-185 |
| | | 185 | 50 | CR2185-185/50 |
| | | 185 | 95 | CR2185-185/95 |
| | | 240 | 240 | CR2300-240 |
| | | 240 | 95 | CR2300-240/95 |
| 17.2 | 3/4 | 10 | 10 | CR235-10-3/4 |
| | | 16 | 16 | CR235-16-3/4 |
| | | 25 | 25 | CR235-25-3/4 |
| | | 35 | 35 | CR235-35-3/4 |
| | | 25 | 25 | CR250-25-3/4 |
| | | 50 | 50 | CR250-50-3/4 |
| | | 70 | 70 | CR2120-70-3/4 |
| | | 95 | 95 | CR2120-95-3/4 |
| | | 95 | 25 | CR2120-95/25-3/4 |
| | | 95 | 70 | CR2120-95/70-3/4 |
| | | 120 | 120 | CR2120-120-3/4 |
| | | 150 | 150 | CR2185-150-3/4 |
| | | 185 | 185 | CR2185-185-3/4 |
| | | 185 | 95 | CR2185-185/95-3/4 |
| | | 240 | 240 | CR2300-240-3/4 |
| | | 240 | 95 | CR2300-240/95-3/4 |

### Equipment




### Necessary Tools




### Recommended Tools

- Butane torch
- Butane gas
- Gloves

Note: Special requirement can be requested.

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# Handle Clamp

## Handle clamp, Handle clamp support & Standard tools

**Kumwell** Handle Clamp is used for handling clamping the mold fit to the right position and tightening, without leakage during the exothermic welding process.

**Kumwell** Handle Clamp Support is designed to use with standard handle clamp to increase the capability of usage in all applications such as cable to steel pipe connection, cable to flat surfac, etc.







### Standards Tools

**Kumwell** Standard Tools are dedicated to use with the main equipments in exothermic welding connection process.

- **Flint Igniter** – for starting the reaction.
- **Cable Clean Brush** – for cleaning cables and other circular conductor.
- **Mold Brush** – for cleaning mold.
- **Busbar Brush** – for cleaning metal flat surface.
- **Scraper** – for remove slag from mold's crucible after finishing the connection.











**Kumwell** Tool Box is a special designed steel case suitable storing of exothermic welding equipments before and after process.



# Handle Clamp

## Handle clamp & Handle clamp support

**Kumwell** Handle Clamp has only 3 type differences; HCB00, HCC00 and HCD00, which is adequate to assort with many different size and types of graphite mold.



### HCB00

**HCB00**
HCB00 type handle clamp assorting with 2"x2" sized mold.



### HCC00 and HCD00

**HCC00 and HCD00**
HCC00 type handle clamp assorting with 3-1/8"x3-1/8" sized mold and 2-5/16" distance between prongs.
HCD00 type handle clamp assorting with 4"x4" sized mold and 3" distance between prongs.



### HCB00-XB or HCB00-XB-12D

**HCB00-XB or HCB00-XB-12D**
Handle clamp with chain support for cathodic mold
HCB00-XB is used to hold a mold fit at its horizontal and vertical position on up to 4" pipe's diameter and
HCB00-XB-12D special chain support for 5" to 12" pipe's diameter.

**Assembly handle clamp with KTA-XB.*



### HCC00-X or HCD00-X

**HCC00-X or HCD00-X**
Handle clamp with chain support "X"
It is used to hold a mold fit at its horizontal and vertical position on up to 4" pipe's diameter. Special chain support can be requested.
HCC00-X and HCD00-X suit to collaborate with CRE6P, CRE18P, CRE19P, CRE20P, CP1 mold's types.

**Assembly handle clamp with KTA-X.*

Note: Special requirement can be requested.

# Handle Clamp

Handle clamp & Handle clamp support



## HCC00-Y or HCD00-Y

**HCC00-Y or HCD00-Y**
Handle clamp with vertical beam support "Y"
It is used to hold a mold fit at its vertical position 0 steel beam or column. HCC00-Y and HCD00-Y suit to collaborate with CS3, CS4, CS7, CS18, CS21, CS22, CS23, CS24, CS25, CS26, CS27, CS28, CS29, CS30, BS1, BS4, BS5, BS8, BS13 mold's types.

**Assembly handle clamp with KTA-Y.*



## HCC00-Z or HCD00-Z

**HCC00-Z or HCD00-Z**
Handle clamp with chain support "Z"
It is used to hold a mold fit in its position ontop of rebar.
HCC00-Z and HCD00-Z suit to collaborate with CRE1P, CRE17P, CA1, CA2 mold's types.

**Assembly handle clamp with KTA-Z.*



## HCC00-V or HCD00-V

**HCC00-V or HCD00-V**
Handle clamp with chain support "V"
This type is recommended to CRE4P, CS16.

**Assembly handle clamp with KTA-V.*



## HCC00-V1 or HCD00-V1

**HCC00-V1 or HCD00-V1**
Handle clamp with chain support "V1"
This type is recommended to CRE5P.

**Assembly handle clamp with KTA-V1.*

Note: Special requirement can be requested.

# Handle Clamp

Handle clamp & Handle clamp support



## HCC00-U or HCD00-U

**HCC00-U or HCD00-U**
Handle clamp with chain support "U"
This type is recommended to CRE3P.

**Assembly handle clamp with KTA-U.*



## HCC00-W or HCD00-W

**HCC00-W or HCD00-W**
Handle clamp with beam support "W"
This type is recommended to CS6, CS31, CS43, BS9, BS11.

**Assembly handle clamp with KTA-W.*



## HCC00-M or HCD00-M

**HCC00-M or HCD00-M**
Handle clamp with vertical magnetic support "M"
It is used to hold a mold fit at its position on vertical steel surface especially on a large size H-beam that another chain or beam support cannot be used.
HCC00-M and HCD00-M suit to collaborate with CS-type mold.

**Assembly handle clamp with KTA-M.*

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# Handle Clamp

## Handle clamp & Handle clamp support

**Kumwell** Handle Clamp has 3 type different type for rail way; HCM00, HCW00 and HCF00, which is adequate to assort with many different sizes and types of graphite mold.



### HCM00

**HCM00**
Handle clamp for railway (Web rail)
This type is recommended to KWRT



### HCW00

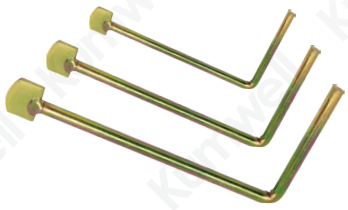
**HCW00**
Handle clamp for railway (Web rail)
This type is recommended to BX3, BX4, CX8, KWS



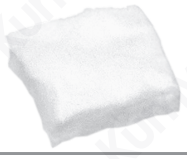
### HCF00

**HCF00**
Handle clamp for railway (Foot of rail / Rail termination (fillet))
This type is recommended to BX1, CX1, CX2, CX7

# Tool & Accessories

| | |
|---|---|
|  | **KTA001**<br><br>**KTA001**<br>Tool box is a special designed steel case, suitable for storing of exothermic welding equipments before and after process. |
|  | **KTA002**<br><br>File is used for rubbing metal surface smooth before making connection. |
|  | **KTA003**<br><br>Busbar Brush is used for cleaning metal flat surface before making connection. |
|  | **KTA004**<br><br>Princers are used to facilitate in making connection. |
|  | **KTA006**<br><br>Cable Clean Brush is used for cleaning cable only before making connection.<br>Note: Cacle Clean Brush is made from brass, thus do not use for cleaning mold. |
|  | **KTA007**<br><br>Mold Brush is used for cleaning crucible and graphite mold's surface by its soft brush. |
|  | **KTA008-KTA011**<br><br>Scraper is used for removing slag from the mold crucible after finishing the connection.<br>Code No. KTA008 is recommended for metal powder code KW15-32, KR25-32, KB15-32<br>Code No. KTA009 is recommended for metal powder code KW45-90, KR45-90, KB45-65<br>Code No. KTA010 is recommended for metal powder code KW115-250, KR115-200<br>Code No. KTA011 is recommended for metal powder code KW300 and Larger |

# Tool & Accessories

| | |
|---|---|
|  | **KTA014U**<br>Flint Igniter is used for starting the reaction. |
|  | **KTA014SU**<br>Flint Stone is used for spare part of flint igniter. |
|  | **KTA015**<br>Disk Container is used to store the steel disk and prevent possible damage. |
|  | **KTA016**<br>Cable Clamp is used for tightening a large-size cable conductor up to 95 $mm^2$. |
|  | **KTA017-KTA018**<br>KTA017 - Butane Torch<br>KTA018 - Butane Gas<br>Butane Torch and Gas is used for removing moisture from mold and conductor to ensure they are totally dry. |
|  | **KTA019**<br>Gloves can help prevent your hands from possible damage. |
|  | **KTA020**<br>Ceramic Fiber is used to prevent leakage from mold and conductors to complete connection. |
|  | **K-MAX-ES400**<br>Remote electronic ignitor with 1.8 cable cord.<br>Recommend Battery: 4 x Li-ion Battery INR18650, 3.7 V, 3500 mAh |
|  | **WE-DS**<br>Duct seal is used to protect the leak of exothermic welding process. |

# Instruction

## K-MAX Mold Type




Inspect all tool & accessories to be ready before starting Exothermic Welding.



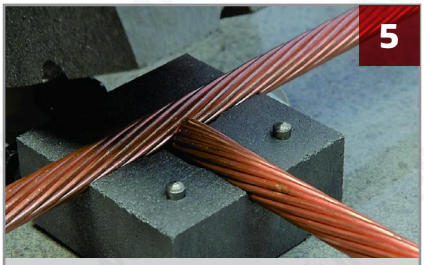

For Electronic Ignitor:
Insert the specified 4 batteries, then push "Power ON/OFF" button to check the status of battery. The indicator should display a green light.



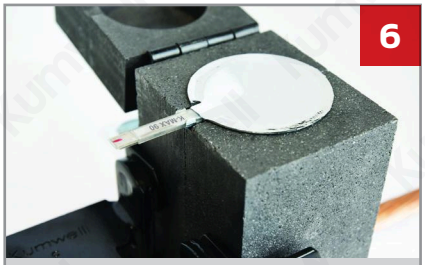

Inspect a nameplate on top of the graphite mold then assembling graphite mold with specific handle clamp.




Prepare the conductor by cleaning with "cable clean brush" and remove moisture around 3-5 minutes with butane torch.




Put the conductors at the connection point, contacting each other, then lock the handle clamp tightly.




Place the K-MAX cartridge in the cavity mold and close the cover.




Clamp the strip with Electronic Ignitor clamp.




Push the "START" button to start the exothermic welding reaction.




Wait for the exothermic welding reaction until finished and leave the graphite mold to cool down for 30 seconds.




Remove the mold from the weld connection. Then gently rub slag from crucible with a scrapper and a mold brush until the dirt is gone.




Inspect the weld connection to be non-porous, and the color is according to standard. Also, the weld connection must be completely bonded.




After finishing the exothermic welding, always keep equipment & necessary tools in the "Kumwell Tools Box".
For K-MAX Elitor: Once finished the process push "POWER ON/OFF" to switch off, take out the battery, and keep this in the bag.

**Caution:**

1. Read the instruction sheet carefully and where attend training before using this product.
2. Refrain from operating it in wet or rainy conditions.
3. Do not use other chargers and other batteries which do not conform to the specified for this device.
4. Do not modify the device, and in the event of any damage replace it with a new one.
5. To preserve the lifespan should take out the battery after finished the exothermic welding.

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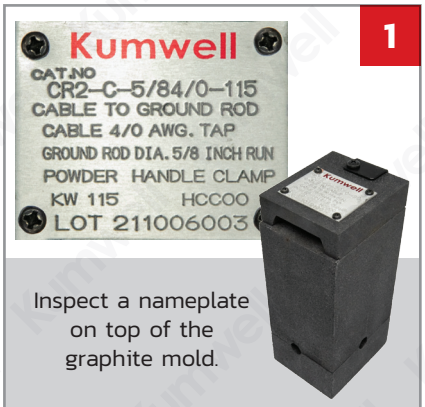
# Instruction

## Standard Mold Type

1




Inspect a nameplate on top of the graphite mold.

2



Assemble mold with a handle clamp.

3



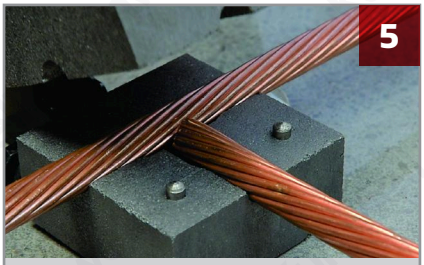
Clean the surfaces of cable conductors and rods with a cable clean brush.

4



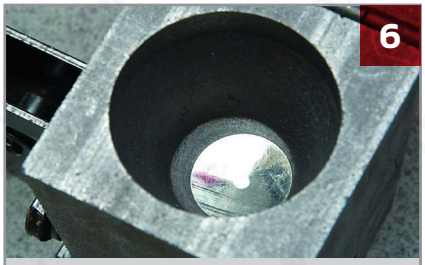
Use the butane torch to remove moisture around the graphite mold and conductors for 3-5 minutes.

5



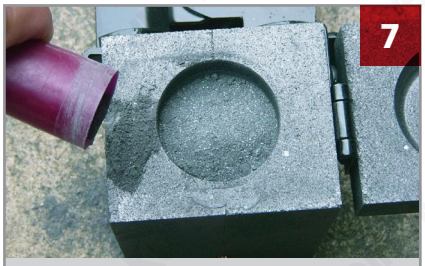
Put the conductors at the connection point, contacting each other, then fasten the handle clamp tightly.

6



Open the mold cover, then put the steel disk at the base of weld metal cavity.

7



Fill the recommended size of weld metal powder into the mold, then squceze the bottom of the tube to fill the starting powder at the edge of the mold cover.

8



Closed the mold cover, then ignite the starting powder at the edge using a fint ignitor to start the exothermic welding reaction.

9



Wait for the exothermic welding reaction until finished and leave the graphite mold to cool down for 30 seconds.

10



Remove the mold from the weld connection. Then, gently rub slag from the crucible with a scrapper and a mold brush until the dirt is gone.

11



Inspect the weld connection to be non-porous, and the color is according to standard. Also, the weld connection must be completely bonded.

12

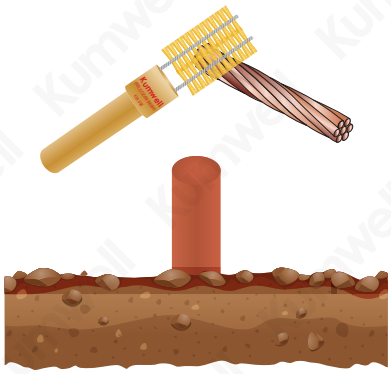


After finishing the exothermic welding, always keep equipment & necessary tools in the "Kumwell Tools Box"

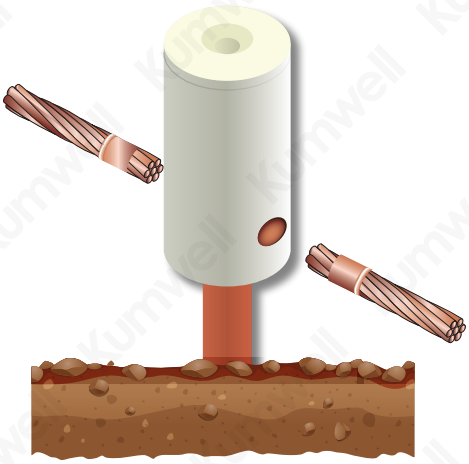
Remark : Recommend using cable clamp for tightening a large-size cable conductor > 95mm².

# Instruction

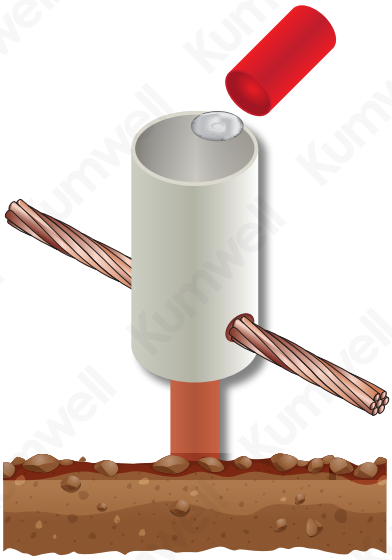
## One Time System



1. Prepare and clean the surface of the conductor and rod by cable clean brush then remove the moisture from mold and conductor by butane torch until the moisture is gone.



2. Wear the slip into the cable or ground rod then put it into the ceramic hole by keeping the connection point to the center of the ceramic cup.



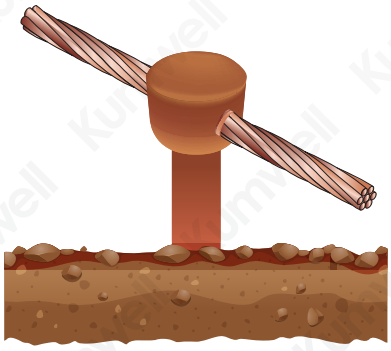
3. put the steel disk at the center of the ceramic cup then pour recommended size of weld metal powder into the ceramic cup.



4. Closed the mold cover then squeeze the bottom of the tube to pour a starting powder around the mold cover, after that ignite with flint gun.



5. Wait for the reaction 30-60 seconds until finish then break the ceramic cup.



6. Complete connection.

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|---|---|---|---|
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| | ● 500 kV GIS At On Nuch Substation Under BLUK Power Supply For The Greater Bangkok Area Phase 2 | Sri-u-thong Co.,Ltd. | 2009 |
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| | ● Belle Condominium | K.M.L. International Co.,Ltd | 2012 |
| | ● Chana Power Plant | K.M.L. International Co.,Ltd | 2012 |
| | ● Wangnoi Power Plant | K.M.L. International Co.,Ltd | 2012 |
| | ● Lopburi Solar Power Plant | K.M.L. International Co.,Ltd | 2012 |
| | ● TOT 3 G | K.M.L. International Co.,Ltd | 2012 |
| | ● Bang Pa - In Power Plant | K.M.L. International Co.,Ltd | 2012 |
| | ● Nongsang Power Plant | K.M.L. International Co.,Ltd | 2012 |
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| | ● Amata B - Grimm At Rayong | K.M.L. International Co.,Ltd | 2012 |
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| | ● Solar Thermal Power Plant At Kanchanaburi | K.M.L. International Co.,Ltd | 2012 |
| | ● Hatyai Submarine Cable | K.M.L. International Co.,Ltd | 2012 |
| | ● 115 kV Bang Pa - In 2 - Ayutthaya 1 | K.M.L. International Co.,Ltd | 2012 |
| | ● P/j The Siam On The River Hotel | K.M.L. International Co.,Ltd | 2012 |
| | ● 115 kV Xekong Ss&xekhamane3 - Xekong Tl, Laos | K.M.L. International Co.,Ltd | 2012 |
| | ● Bang Pa - In Solar Plant | K.M.L. International Co.,Ltd | 2012 |
| | ● Ubonratchathani Bioeternal Substation | K.M.L. International Co.,Ltd | 2012 |
| | ● The International Convention And Exhibition Center Commemorating His Majesty's 7th Cycle Birthday Anniversary | K.M.L. International Co.,Ltd | 2012 |
| | ● Central Rama 9 | K.M.L. International Co.,Ltd | 2012 |
| | ● Central Festival Samui | Elmec Engineering Co.,Ltd | 2013 |
| | ● S One Perspective Department Store At Kadrincome | Precise Corporation Co.,Ltd | 2013 |
| | ● Boonthavorn Rama 2 | Secco Co.,Ltd | 2013 |
| | ● MRTA Purple Line | Sino - Thai Engineering & Construction Co.,Ltd | 2013 |
| | ● Central Hatyai Project | 205 Engineering Co.,Ltd | 2013 |
| | ● Phuket Airport Development Project | Sino - Thai Engineering & Construction Co.,Ltd | 2013 |
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| | ● Nong Sang Power Plant Nakhonsawan | Sino - Thai Engineering & Construction Co.,Ltd | 2013 |
| | ● Kanom Power Substation | Siemens Co.,Ltd | 2013 |
| | ● Tesco Lotus Rdc | Prosper Engineering Co.,Ltd | 2013 |
| | ● BTS Bangwa Station | Suvis Co.,Ltd | 2013 |
| | ● Chana Power Plant Development | Siemens Co.,Ltd | 2013 |

Remark : The aforementioned project is some of the domestic project references

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|---|---|---|---|
| EGAT | ● Lam Takong Wind Turbine Generation | Hydrochina Corporation | 2017 |
| | ● 230 kV Ayutthaya 4 - Sikhiu 2 | C.H.C. Engineering | 2017 |
| | ● 230 kV Mae Moh, Pha Yao | Globaltronic Intertrade Co., Ltd. | 2017 |
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| | ● Mae Moh Generation Plant | Globaltronic Intertrade Co., Ltd. | 2017 |
| | ● Transmission Lines 115 kV Nakhon Phanom - Sakon Nakhon 2 | Sri U-thong | 2017 |
| | ● Transmission Lines115 kV Amnat Charoen Mukdahan | Sri U-thong | 2017 |
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| | ● Fire Protection System Phase 3 | Kinden | 2017 |
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| | ● T3 Wind Farm | Italthai Engineering | 2017 |
| | ● Solar Farm | Tns Instrument And Engineering Co., Ltd. | 2017 |
| Ramathibodi Hospital | ● Ramathibodi Hospital Rama 6 Building | P. S. Power Lines Company Limited | 2017 |
| Genesis | ● Genesis Data Center | Prosper Engineering | 2017 |
| PTT | ● PTT Khao Hin Son, Chachoeng Sao | Rk3 Engineering & Development | 2017 |
| | ● PTT Lng | Royaltec International | 2017 |
| Cambodia | ● Celti 150MW Coal Power Plant, Si Hanoukville | Globaltronic Intertrade | 2017 |
| AOT | ● Suvarnabhumi Airport | Italian-thai Development | 2017 |
| EGCO | ● Rayong Generation Plant, Amata City | Globaltronic Intertrade | 2017 |
| Malaysia | ● Scc Rapid (Petronas) | Royaltec International | 2017 |
| PEA | ● 8.965MW Vspp-pea | Italthai Engineering | 2017 |
| | ● Bang Phai Substation | Royaltec International | 2017 |
| | ● Lamphun Substation, Northern Region Industrial Estate | Interlink Communication Public Co., Ltd. | 2017 |
| | ● 115 kV Transmission Line Mae Hon Son | Eastern Technical Engineering Public Company Limited | 2017 |
| Sea Gate | ● Siri Plaza | Aka Co., Ltd. | 2017 |
| IDEO Ananda Development | ● Ideo 02 Bang Na | N.R.Engineering Co., Ltd. | 2017 |
| Central | ● Central Festival Phuket | Power Line Engineering Public Company Limited | 2017 |
| | ● Central Mahachai | Elmech Engineering Co., Ltd. | 2017 |
| | ● Central Nakhon Ratchasima | Inwire Engineering Company Limited | 2017 |
| Chulalongkorn University | ● Cu Centennial Park | Syntec Construction Public Company Limited | 2017 |
| Makro | ● Makro Pathumthani | Entecon Company Limited | 2017 |
| | ● Makro Kalasin | Entecon Company Limited | 2017 |
| Thai Government | ● Paliament House Of Thailand | Power Line Engineering Public Company Limited | 2017 |
| | ● Thai Supreme Court Building | Power Line Engineering Public Company Limited | 2017 |
| | ● Office Of Court Of Justice | Power Line Engineering Public Company Limited | 2017 |
| Royal Thai Navy | ● Royal Thai Navy Armory | Winning System Engineering Limited Partnership | 2017 |
| Mass Rapid Transit Authority of Thailand | ● MRTA Blue Line | Sino-thai Engineering & Construction Public Company Limited | 2017 2017 |
| | ● MRTA Green Line | Power Line Engineering Public Company Limited | 2017 |
| | ● MRTA Red Line | Italian-thai Development | 2017 |
| Charoen Pokphand | ● CP Ram Khon Khen | Christiani & Nielsen (Thai) Public Company Limited | 2017 |
| Department of Highways | ● Motorway Chonburi | Entecon Company Limited | 2017 |
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| Myanmar | ● Minjar Power Plant | Demco Public Company Ltd. | 2017 |

Remark : The aforementioned project is some of the domestic project references

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| Owner | Project Name | Distributor | Period |
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| Tesco Lotus | ● Tesco Lotus Fang District | Thanacha Co., Ltd. | 2017 |
| | ● Tesco Lotus Prakhon Chai District | Prosper Engineering | 2017 |
| IKEA | ● Ikea Bang Yai | Thai Semcon Co., Ltd. | 2017 |
| MEA | ● MEA Feeder Remote Terminal Unit (FRTU) | Precise Electro-mechanical Works Co., Ltd. | 2017 |
| | ● Substation Prawet | Sb Powertech Co., Ltd. | 2017 |
| | ● Substation Pra Nakorn Tai | Transec Power Services Co., Ltd. | 2017 |
| | ● Substation Prachachun | Klang Faifa Rog-ngan Co., Ltd. | 2017 |
| CP ALL | ● CP All Buriram | Royaltec International | 2017 |
| ENSYS | ● Biomass Power Plant Ensys | N.R.Engineering Co., Ltd. | 2017 |
| PEA | ● 115 kV Transmission Line Rojana, Ayutthaya | Rss 2016 Co., Ltd. | 2017 |
| Supalai | ● Supalai Elite Surawong | Secco Engineering & Construction Co.,Ltd. | 2017 |
| | ● Supalai Elite Phayathai | Secco Engineering & Construction Co.,Ltd. | 2017 |
| | ● Supalai Veranda Ratchavipha | Secco Engineering & Construction Co.,Ltd. | 2017 |
| | ● Supalai Wellington 2 | Secco Engineering & Construction Co.,Ltd. | 2017 |
| | ● Supalai Loft Chaeng Watthana | Secco Engineering & Construction Co.,Ltd. | 2017 |
| | ● Supalai Elite Phayathai | Secco Engineering & Construction Co.,Ltd. | 2017 |
| TESCO LOTUS | ● Tesco Lotus Kuchinarai (Kalasin) | Prosper Engineering | 2017 |
| B.Grimm Power | ● 115 kV Terminal Sub Abpr5 | Demco Public Company Ltd. | 2017 |
| PEA | ● Central Pattaya Substation (Chonburi) | Secco H.V. Co Ltd | 2017 |
| | ● 115 kV Khao Mai Kaeo, Chonburi | Demco Public Company Ltd. | 2017 |
| TFG | ● Tfg-further Product Factory | V Neramit Co., Ltd. | 2017 |
| JWS Construction | ● The Garden 9 (Lat Krabang) | V Neramit Co., Ltd. | 2017 |
| มหาวิทยาลัยแม่ฟ้าหลวง จังหวัดเชียงราย | ● Mae Fah Luang University | Vars Co., Ltd. | 2017 |
| | ● Bang Kruai Hospital 2 | Royaltec International | 2017 |
| | ● Gymnasium Chitralada School | Italthai Engineering Co., Ltd. | 2017 |
| Platinum Market | ● The Market By Platinum | First Technology Co., Ltd. | 2017 |
| Vietnam | ● Thai Binh 1 Thermal Power Plant | Globaltronic Intertrade | 2017 |
| AP (THAILAND) | ● Aspire Sathorn-ratchapruek | Tri-en Solution Co., Ltd. | 2017 |
| | ● Aspire Erawan | Prosper Engineering | 2017 |
| TAKATA | ● Takata Industrial Plant | Bania Engineering Co., Ltd. | 2017 |
| Laos | ● Hydroelectric Power Nam Ngiep | R C R Co., Ltd. | 2017 |
| | ● The Saint Residences Vibhavadi Rangsit | Secco Engineering & Construction Co.,Ltd. | 2017 |
| เกษมทรัพย์สิริ 2 | ● Aec Market Building | Power Line Engineering Public Company Limited | 2017 |
| EGAT | ● 500 kV Chaeng Watthana Substation | Demco Public Company Ltd. | 2017 |
| | ● 500 kV Transmission Line Chaiyapoom | Demco Public Company Ltd. | 2017 |
| Phuket Sirinath Property | ● The Terminal Phuket | Engnue Technology Co., Ltd. | 2017 |
| EGAT | ● Supply Grounding Material | Kumwell | 2018 |
| | ● Transmission Lines 230 kV Chachoengsao 2 - Prachinburi 2 | Demco Public Company Limited | 2018 |
| | ● Transmission Lines 550 kV Bang Saphan 2 - Surat Thani 2 | Kalpataru Limited | 2018 |
| | ● Underground Transmission Line 230kV South Bangkok | TEDA Company Limited | 2018 |
| | ● Transmission Lines 500kV Bang Saphan 2 - Surat Thani 2 | Larsen & Toubro Limited | 2018 |
| | ● 230/115 kV Ao Phai Substation (GIS) | Sinohydro (Thailand) Co., Ltd. | 2018 |
| | ● Transmission Lines 500kV Ubon Ratchathani 3 - Roi Et 2 | RCR | 2018 |
| | ● Transmission Lines 500kV Bang Saphan 2 - Surat Thani 2 | Loxley Public Company Limited | 2018 |
| | ● Supply of Miscellaneous Equipment Bulk Power Supply for the Greater Bangkok and Vicinity Area Phase 3 | Maclean - Dulhunty Power (Thailand) Limited | 2018 |

Remark : The aforementioned project is some of the domestic project references

# References

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| EGAT | ● 115 kV Phatthalung Substation (GIS) | Italthai Engineering Co., Ltd. | 2018 |
| | ● South Bangkok Power Plant | Marubeni Corporation | 2018 |
| PEA | ● Substation Phuket | Siemens | 2018 |
| | ● 115 kV Substation Songkhla | IGEN Engineering | 2018 |
| | ● 115/33 kV Hanuman Wind Farm | ABB | 2018 |
| | ● Sikhiu 3&5 Wind Farm Substation | Grid Solution | 2018 |
| GULF | ● Gulf Sriracha Substation | Mitsubishi Electric Asia | 2019 |
| EGAT | ● 500 kV Surat Thani Substation | Larsen &Toubro Limited | 2019 |
| | ● 230 kV Ao Phai Substation | Sino Hydro | 2019 |
| | ● Bangpakong Power Plant | Royaltech International | 2019 |
| | ● 230 kV Khlong Dan Substation | Larsen &Toubro Limited | 2019 |
| | ● 500 kV Pluak Daeng Substation | KEC International Limited | 2019 |
| SRT | ● Bangsue – Rangsit Redline | Italianthai Development | 2019 |
| | ● Red Line Grand Station | Unique Engineering | 2019 |
| MRTA | ● Orange Line | Italthai Engineering | 2019 |
| | ● Green Line | Italianthai Development | 2019 |
| ICON SIAM | ● Gold Line | Italianthai Development | 2019 |
| AOT | ● Suvarnabhumi Airport Phase2 | Power Line Engineering | 2019 |
| AEROTHAI | ● VOR / DME Betong Airport | Pornpian Co., Ltd | 2019 |
| EGAT | ● 500 kV Bang Saphan 2 – Surat Thani 2 | Kalpataru Power Transmission Limited (KPTL) | 2019 |
| | ● 230 kV Chatuchak | Globaltronic Intertrade Co.,Ltd. | 2019 |
| PEA | ● 115 KV Aranyaprathet Substation | Demco Public Company Limited | 2019 |
| | ● Khlongkhuean Substation | U Services | 2019 |
| MEA | ● Koto Station & Phraek Sa Station | TEDA Co., Ltd | 2019 |
| | ● Chandrakasem, SuanSom, Rungpracha Substation | Siemens | 2019 |
| EGAT | ● EGAT: Saraburi 6 Substation | Italthai Engineering | 2019 |
| | ● EGAT: 115 kV Khon-Khaen | Italthai Engineering | 2019 |
| | ● EGAT: Phuket Substation | Italianthai Development | 2019 |
| PEA | ● LIGOR Wind Power Plant | Italthai Engineering | 2019 |
| | ● 115 / 22 kV GIS Substation | ABB | 2019 |
| SUPALAI | ● Varenda Phasicharoen | Secco | 2019 |
| | ● Oriental Sukhumvit 39 | Secco | 2019 |
| | ● Riva Grand | Secco | 2019 |
| King Chulalongkorn Memorial Hospital | ● Phor Por Ror Building | Quesco | 2019 |
| NARAI PROPERTY | ● The Parkland Charan - Pinklao | Secco | 2019 |
| CP | ● CP Tower 2 | Syntec | 2019 |
| SINGHA | ● SINGHA Complex | Secco | 2019 |
| THAI OIL | ● Main Building Sriracha | Prosper Engineering | 2019 |
| | ● GPD | T.Y.K.(Thailand) Company Limited | 2021 |
| B.Grimm Power | ● Amata B.Grimm Power(AIE-MTP) LIMITED | Globaltronic Intertrade Company Limited | 2021 |
| EGAT | ● Pluak Dang Substation | Precise System and Project Company Limited | 2021 |
| Gulf | ● Pluak Dang Power Plant | T.Y.K.(Thailand) Company Limited | 2021 |
| | ● Solar | N.R.Engineering Company Limited | 2021 |
| | ● RDFPP Rayoung | 4484 Holding Company Limited | 2021 |
| | ● Krungsri Bank Rama 3 | N.R.Engineering Company Limited | 2021 |
| PEA | ● Mae Sai Substation (Chiang Rai) | Advanced Information Technology Public Company Limited | 2021 |
| EGAT | ● NO.TS12-S-12 230kV GIS Chon Buri 2 | K.E.C. International Limited | 2021 |

Remark : The aforementioned project is some of the domestic project references

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| | ● Wattana-nakhon Substation J1900 | Precise System and Project Company Limited | 2021 |
| | ● Contract No.S100855-3165-TS12-MC1-10-PRO | Progressive INTER-TRADE Company Limited | 2022 |
| Gulf | ● Ratchaburi Power Plant | T.Y.K.(Thailand) Company Limited | 2022 |
| EGAT | ● Khlong Dan Substation | Larsen & Toubro Limited | 2022 |
| B.Grimm Power | ● IGlobaltronic Intertrade Company Limited | Globaltronic Intertrade Company Limited | 2022 |
| EGAT | ● TS12-S-22 230-115KV Ranyong 4,3,2,1 | TEDA Company Limited | 2022 |
| MEA | ● Khlong Dan Departure Station (Substation) | SINOHYDRO (THAILAND) Company Limited | 2022 |
| EGAT | ● Lamphun III Substation & Jomthong Substation | Sri U-Thong Company Limited | 2022 |
| SAMART | ● Sing Buri Substation | Sing Buri Substation | 2022 |
| EGAT | ● Supply and Construction of 500kV Thung Song Substation (GIS) and 230kV Thaung Song Substation | SINOHYDRO AND SEPCO III Joint Venture | 2022 |
| | ● EGAT Nong Chok | Kumwell Corporation Public Company Limited | 2022 |
| | ● Double Track Railway | S & J Power Company Limited | 2022 |
| | ● 500KV/230KV and 115KV GIS BL2 | TEDA Company Limited | 2023 |
| | ● Thung Song Substation | SINOHYDRO AND SEPCO III Joint Venture | 2023 |
| Gulf | ● Hin Kong Power Plant (Ratchaburi) | T.Y.K.(Thailand) Company Limited | 2023 |
| EGAT | ● 230 Rayong 4 | TEDA Company Limited | 2023 |
| PEA | ● Bang Lamung II Substation (Sukhumvit Road - South Pattaya I) | Interlink Power and Engineering Company Limited | 2023 |
| MEA | ● Phutthamonthon Sai 2 Station | Interlink Power and Engineering Company Limited | 2023 |
| PEA | ● Kabinburi IV Substation | Advance Civil Group Company Limited | 2023 |
| EGAT | ● RTS2-S-10(R) KK1 Substation | Italthai Engineering Company Limited | 2023 |
| | ● Chonburi 2 | K.E.C. International Limited | 2023 |
| | ● Pluak Dang Substation | Precise System and Project Company Limited | 2023 |
| | ● Double Track Railway (MKB-TNJ) | Globaltronic Intertrade Company Limited | 2023 |
| PEA | ● 115KV Nong Chan-Huai Bong (Saraburi) | E-INNOVATIONS Corporation Company Limited | 2023 |

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| | ● Adwea Project | Gulf Radiant Electrical & Trading L.L.C. | 2001 - 2002 |
| QATAR | ● Qatar Petroleum Gas | Gulf Radiant Electrical & Trading L.L.C. | 2003 |
| SUDAN | ● Melut Basin Oil | Gulf Radiant Electrical & Trading L.L.C. | 2003 |
| INDIA | ● Purula-hydro Power Plant | Taisei Corporation | 2003 - 2004 |
| VIETNAM | ● Binh Trieu-hcm 110KV, Phu Tho-hcm 110KV | V.T.E.C.H. Electrical Technology Co.,Ltd. | 2004 |
| CHINA | ● Shanghai Power Plant | Nova Technology Co.,Ltd. | 2004 |
| PAKISTAN | ● Lpg Extraction Plant | ABB PVT.Ltd | 2004 |
| | ● 500kV/220 Ntoc-kekc | Pacific Engineering Co.,Ltd. | 2005 |
| MALAYSIA | ● 500kV T/l Transmission Lines For 1400mw Jimah Power Project | Fujikura Ltd. | 2005 |
| LAOS | ● Nam Theun 2 Hydro Power Project Em2 Transmission Line | J-Power System Corporation | 2005 |
| VIETNAM | ● Cu Mau Combine Cycle Power Plant Petro | V.T.E.C.H. Electrical Technology Co.,Ltd. | 2006 - 2007 |
| CHINA | ● Shantou 500KV Substation | Nova Technology Co.,Ltd. | 2007 |
| | ● Shi Hua Yang Zhuang River Project | Nova Technology Co.,Ltd. | 2008 |
| MALAYSIA | ● Hospital Petronas (Klcc Health Care Center) | Hellerman Letrik Sdn. Bhd. | 2008 |
| | ● Kuala Lumpur International Airport (Klia) | Hellerman Letrik Sdn. Bhd. | 2008 |
| | ● Cu Mau Combine Cycle Power Plant Petro | Hellerman Letrik Sdn. Bhd. | 2008 |
| | ● Maxis Telecom Malaysia | Hellerman Letrik Sdn. Bhd. | 2008 |
| PAKISTAN | ● Gas Turbine Power Plant | Pacific Engineering Co.,Ltd. | 2008 |
| U.A.E | ● Dewa-d.f.o. Pipeline | Gulf Radiant Electrical & Trading L.L.C. | 2009 |
| | ● Abu-dhabi International Airport 2k Runway Project | Gulf Radiant Electrical & Trading L.L.C. | 2009 |
| | ● Du Telecom Tower Civil Works | Gulf Radiant Electrical & Trading L.L.C. | 2009 |
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| IRAQ | ● Us Army Jlsc-doha, Project Iraq/afghanistan | Gulf Radiant Electrical & Trading L.L.C. | 2009 |
| | ● Pier & Seawall Project, Umm Qasr, Basra-iraq | CCI Inc. | 2009 |
| VIETNAM | ● Main Gas Filling Station | V.T.E.C.H. Electrical Technology Co.,Ltd. | 2009 |
| CHINA | ● Yinnan Province Xiao Wan Hydro-power Plant | Nova Technology Co.,Ltd. | 2009 |
| | ● Shangdong Province Dezhou 500 kV Substation | Nova Technology Co.,Ltd. | 2009 |
| INDONESIA | ● Sengkang | | 2008 |
| TRINIDAD AND TOBAGO | ● Brechin Castle Substation | Petrotrin, Petroleum Company of Trinidad and Tobago Limited. | 2010 |
| | ● EPC Refinery Substation Project : 2312 | Petrotrin, Petroleum Company of Trinidad and Tobago Limited. | 2010 |
| VIETNAM | ● Da Nang Internation Airport-danang City | CNA-HTE / Middle Airports Corporation-MAC | 2010 |
| COLOMBIA | ● Santa Marta Substation Project 2365 | HMV Ingenieros Ltda | 2010 |
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| INDONESIA | ● Tanjung Tabalong | | 2011 |
| COLOMBIA | ● Pacific Rubiales Corporation Oil Industrial Complax. | CAM Colombia (Compania Americana De Multiservicios) | 2011 - 2012 |
| VENEZUELA | ● Tocoma Hidroelectric Project (2000 Mva) Rio Caroni Pto. Ordaz | Consorcio Oiv Tocoma Odebrecht - Imoregilo - Vincler | 2011 - 2013 |
| INDONESIA | ● KDL 120mw Combined Cycle Power Plant Project | Kratatau Daya Listrik | 2013 |
| LAO PDR | ● Nong Deun - Seno - Meuang Phine 115kV Transmission Project | China-East Resources Import & Export Co. | 2014 - 2016 |
| | ● Xayaburi Hydroelectric Power Project : Package 4 : 500kV Transmission Line | China-East Resources Import & Export Co. | 2014 - 2016 |
| SINGAPORE | ● Exxon | Alstom Grid Pte Ltd (Singapore) | 2016 |

Remark : The aforementioned project is some of the international project references

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| | ● 66kV Kyaukphyu Substation Switchbay | Arkarthit Enterprise Co.,Ltd. | 2015 |
| | ● 66/11kV, 10 Mva Kyaukkayate Substation | Arkarthit Enterprise Co.,Ltd. | 2015 |
| | ● 230kV Switchbay Extension At Thaketa Substation | Arkarthit Enterprise Co.,Ltd. | 2015 |
| | ● 66/11kV, 5 Mva Shardaw Substation | Arkarthit Enterprise Co.,Ltd. | 2015 |
| | ● 66kV Moegoke Ss Switchbay | Arkarthit Enterprise Co.,Ltd. | 2015 |
| | ● Mandalay Project | Arkarthit Enterprise Co.,Ltd. | 2016 |
| | ● Mawlamying Ss Extention | Arkarthit Enterprise Co.,Ltd. | 2016 |
| | ● 43T / MEPE (PTP) | Arkarthit Enterprise Co.,Ltd. | 2016 |
| | ● New Life Myanmar Hotel Project | Arkarthit Enterprise Co.,Ltd. | 2016 |
| BANGLADESH | ● 230 kV Extension In Existing 230/132 kV Substation At Khulna South On Turnkey Basis | N.R. Engineering Co.,Ltd. | 2016 |
| LAO PDR | ● Xe Namnoy And Xe Katam Hydropower Project | B.Grimm Power Public Company Limited | 2016 |
| INDONESIA | ● Jawa 2 Coal Fired Power Plant | PT. Promindo | 2016 |
| | ● Kalsel-1 Coal Fired Power Plant | PT. Raj Prima | 2016 |
| PAKISTAN | ● K Electric Rehabilation (Tp100 Project) | Siemens | 2016 |
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| | ● Npk Phu My Power Plant Project | V.T.E.C.H. Electrical Technology Co.,Ltd. | 2016 |
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| | ● Thai Binh 1 Thermal Power Plant | V.T.E.C.H. Electrical Technology Co.,Ltd. | 2016 |
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| | ● Metro Linie Nhon - Ha Noi Station | V.T.E.C.H. Electrical Technology Co., Ltd. | 2017 |
| INDONESIA | ● Lumut Balai Geo Thermal | PT.Raj Prima | 2017 |
| | ● Solar Photovoltaic Electricit | PT.Raj Prima | 2017 |
| | ● 150kV Bekasi Substation | PT.Raj Prima | 2017 |
| | ● Tangguh Expension Project | PT.Raj Prima | 2017 |
| | ● Petrokimia Butadiene Indonesia Extraction Plant | PT.Raj Prima | 2017 |
| | ● 150kV BSD Substation | PT.Raj Prima | 2017 |
| | ● 150kV Pasar Kermis Substation | PT.Raj Prima | 2017 |
| | ● PLTMG Package 4 Project | PT.Raj Prima | 2017 |
| | ● Kalsel 1- CFPP Project Power Plant | PT.Raj Prima | 2017 |
| | ● MRT Jakarta Project | PT.Raj Prima | 2017 |
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| | ● Cam Ranh International Airport | V.T.E.C.H. Electrical Technology Co., Ltd. | 2017 |
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| | ● 150kV Pandaan Baru Substation | PT.Raj Prima | 2018 |
| | ● 150kV Sukatani Extension Substation | PT.Raj Prima | 2018 |
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| | ● PT.OAKTECH NUSANTARA | PT Raj Prima | 2021 |
| | ● PT. GANDIVA INFINITY KARYA (JGC MARUNDA 2.0 BEKASI) | PT Raj Prima | 2021 |
| | ● 150KV KTT MNA SUBSTATION | PT Raj Prima | 2021 |
| | ● PT. PRIMA POWER NUSANTARA GI 150KV CIKUMPAY | PT Raj Prima | 2021 |
| | ● PT.WERSA MULTI INTERNASIONAL PROJECT: SHELL MARUNDA | PT Raj Prima | 2021 |
| | ● GI 150 kV SANDAI | PT Raj Prima | 2021 |
| | ● SMK-GI 150kV Maloy | PT Raj Prima | 2021 |
| HONGKONG | ● COMPLEXO DE CUIDADOS DE SAUDE DAS ILHAS-HOSPITAL | NOVA TECHNOLOGY COMPANY. LTD. | 2021 |
| MALAYSIA | ● BUNUT TO MEDAMIT 275KV TRANSMISSION LINE PROJECT | KEC INTERNATIONAL(MALAYSIA) Sdn Bhd | 2021 |
| SINGAPORE | ● CHANGI EAST AIR-BASED | HENG HARDWARE ENGINEERING PTE LTD | 2021 |
| UAE | ● ADNOC-AD / IRAQ | GULF RADIANT ELECTRICAL & TRADING LLC. | 2021 |
| | ● FEWA FUJAIRAH F3 IPP | GULF RADIANT ELECTRICAL & TRADING LLC. | 2021 |
| | ● DEWA | GULF RADIANT ELECTRICAL & TRADING LLC. | 2021 |
| | ● FEWA | GULF RADIANT ELECTRICAL & TRADING LLC. | 2021 |
| MYANMAR | ● 3T/YESC/2021 & 5T/YESC/20-21 | Arkarthit Enterprise | 2021 |
| LAOS | ● SUVANAKHET UNIVERSITY NEW CAMPUS | 3S SDC CIVIL & ELECTRIC CO.LTD | 2021 |
| SOUTH KOREA | ● SOLAR POWER PLANT IN GAPYEONG, KOREA | K POWER CO.,LTD. | 2021 |
| SINGAPORE | ● CHANGI EAST AIR-BASED | HENG HARDWARE ENGINEERING PTE LTD | 2021 |
| HANGARY | ● MVM EXPERT | BURKEN LTD. | 2021 |
| INDONESIA | ● PT.OAKTECH NUSANTARA | PT Raj Prima | 2022 |
| UAE | ● AGOGO SUBSTATION, GHANA | GULF RADIANT ELECTRICAL & TRADING LLC. | 2022 |
| | ● HITACHI CIVIL WORKS | GULF RADIANT ELECTRICAL & TRADING LLC. | 2022 |
| | ● KUWAIT PETROLEUM | GULF RADIANT ELECTRICAL & TRADING LLC. | 2022 |
| INDONESIA | ● GI 150kV MALOY | PT Raj Prima | 2022 |
| UAE | ● AL DHAFRAH - PV INDEPENDENT POWER PROJECT - ABU DHABI | GULF RADIANT ELECTRICAL & TRADING LLC. | 2022 |
| | ● AL DHAFRAH-UAE | GULF RADIANT ELECTRICAL & TRADING LLC. | 2022 |
| HONGKONG | ● GUANGZHOU STOCK | NOVA TECHNOLOGY COMPANY. LTD. | 2022 |
| INDONESIA | ● SALAK | PT Raj Prima | 2022 |
| UAE | ● NEW SOLAR IN OMAN & U.A.E. | GULF RADIANT ELECTRICAL & TRADING LLC. | 2022 |
| VIETNAM | ● VUPHONG, TAN THANHAN, LAGUNA, VIETTEL | V.T.E.C.H Electrical Technology Co. Ltd. | 2022 |
| CAMBODIA | ● NOVOTEL | N.R ENGINEERING CO., LTD | 2022 |
| VIETNAM | ● THANH TAM,VO PHAN LE; TAN THANH AN,VIETTEL, AC03 | V.T.E.C.H Electrical Technology Co. Ltd. | 2022 |
| | ● VIETTEL | V.T.E.C.H Electrical Technology Co. Ltd. | 2022 |
| HONGKONG | ● COLOMBO CITY PORT DEVELOPMENT | NOVA LPS ENGINEERING COMPANY LIMITED | 2022 |
| VIETNAM | ● NESTLE | V.T.E.C.H Electrical Technology Co. Ltd. | 2022 |
| CAMBODIA | ● ECOMALL | N.R ENGINEERING CO., LTD | 2022 |
| UAE | ● ETIHAD RAILWAY | GULF RADIANT ELECTRICAL & TRADING LLC. | 2021-2022 |
| PAKISTAN | ● 500KV PAKISTAN (TLM-10-2020) | MOSDORFER GMBH | 2022 |

Remark : The aforementioned project is some of the international project references

# References

| Owner | Project Name | Distributor | Period |
|---|---|---|---|
| SINGAPORE | ● Stock Project | HENG HARDWARE ENGINEERING PTE LTD | 2023 |
| VIETNAM | ● DONG NAI, VU PHONG, THANG TIEN, PECC 2 | V.T.E.C.H Electrical Technology Co. Ltd. | 2023 |
| MYANMAR | ● EARTHING MATERIALS_C-98 PROJECT- SMA & RETAIL #38-AKT | Arkarthit Enterprise | 2023 |
| INDONESIA | ● PT.PROMINDO MAKMUR ABADI | PT Raj Prima | 2023 |
| CAMBODIA | ● CBC | N.R ENGINEERING CO., LTD | 2023 |
| SRI LANKA | ● Stock Project | ROTAX (PVT) LTD. | 2023 |
| VIETNAM | ● NEO ADVANCE; EMC; NTD | V.T.E.C.H Electrical Technology Co. Ltd. | 2023 |
| | ● LILAMA;MEPAC | V.T.E.C.H Electrical Technology Co. Ltd. | |
| CAMBODIA | ● Stock Project | LIUMENG SUPPLY OF M&E MATERIALS LTD. | 2023 |
| | ● OJI Factory | N.R ENGINEERING CO., LTD | |
| VITENAM | ● NEO | V.T.E.C.H Electrical Technology Co. Ltd. | 2023 |
| PHILIPPINES | ● Stock Project | PRISMA ELECTRICAL CONTROLS CORP. | 2021-2023 |
| HUNGARY | ● Stock Project | BURKEN LTD. | 2023 |
| CAMBODIA | ● AIRPORT PHNOM PENH | N.R ENGINEERING CO., LTD | 2023 |
| INDONESIA | ● PT. MERCURY TEKINDO INTERNUSA | PT Raj Prima | 2023 |
| VITENAM | ● LDCT HCM | V.T.E.C.H Electrical Technology Co. Ltd. | 2023 |
| UAE | ● ABU DHABI / ADNOC | GULF RADIANT ELECTRICAL & TRADING LLC. | 2023 |
| INDONESIA | ● JASA EPC PEMBANGUNAN GARDU INDUK 150KV UNTUK | PT Raj Prima | 2023 |
| | PENYAMBUNGAN TENEGA LISTRIK PLN KE UBPN KOLAKA | | |
| MYANMAR | ● 500KV TRANSMISSION LINE PROJECT 20-21 | Arkarthit Enterprise | 2022-2023 |
| | (HLAING THAR YAR-PHAYARGYI) | | |
| HONGKONG | ● CMI Project | NOVA TECHNOLOGY COMPANY. LTD. | 2023 |
| VIETNAM | ● NHON TRACH 3-4 POWER PLANT | V.T.E.C.H Electrical Technology Co. Ltd. | 2023 |
| | ● MEPAC;SALA | V.T.E.C.H Electrical Technology Co. Ltd. | 2023 |

Remark : The aforementioned project is some of the international project references

CHINA : 6100 MW YANGJIAN NUCLEAR POWER PLANT



DUBAI : BARZAN ONSHORE FACILITIES PROJECT IN RAS LAFFAN, QATAR



VENEZUELA : TOCOMA HIDROELECTRIC PROJECT (2000 MVA) RIO CARONI PTO. ORDAZ



THAILAND : PTT GASSEPARATION PLANT



COLOMBIA : CENTRAL 20MW EPM-EPC SE MALENA SUBSTATION 230 kV



MALAYSIA : KUALA LUMPER INTERNATIONAL AIRPORT - KLIA (MALAYSIA)



VIETNAM : 500KV TAN DINH - SONG MAY POWER LINE



INDIA : INDIA RAILWAYS




THAILAND : 230/500kV, PLUAK DAENG ELECTRICITY GENERATING AUTHORITY OF THAILAND, (EGAT)



CHINA : HIGH SPEED TRAIN



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