



Spring Pressure Connection Technology
Vibration-Proof – Fast – Maintenance-Free





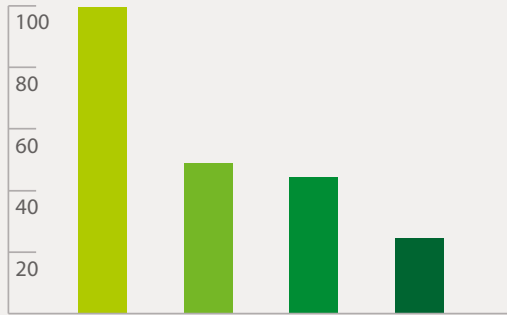
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Advantages of CAGE CLAMP® Connections:

- Time savings
- Maintenance-Free
- For all conductor types
- Reliable in all applications
- Long-term contact quality independent of the operator skill

Comparison of Average Manual Wiring Times in Percentages (per MTM)



- Screw connection
- Tool-operated CAGE CLAMP® and Push-in CAGE CLAMP® termination of fine-stranded conductors without ferrules
- Tool-operated CAGE CLAMP® termination of solid and ferruled, fine-stranded conductors
- Push-in CAGE CLAMP® termination of solid, stranded and ferruled, fine-stranded conductors

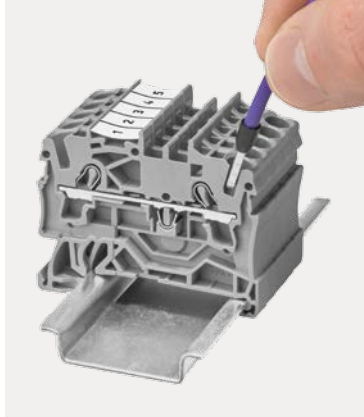
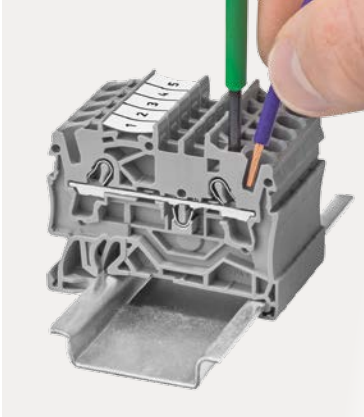
REDUCE COSTS

Save Time

- WAGO's Spring Pressure Connection Technology eliminates time-consuming screw tightening.
- No specialty tool is required (e.g., torque wrench).
- CAGE CLAMP® is easy to use: Open the clamping unit, insert conductor, release the clamp – done!
- Push-in CAGE CLAMP® termination is even faster: Solid, stranded and ferruled, fine-stranded conductors can be simply pushed into unit.

Your Advantages:

- Shorter wiring times to reduce your labor costs!
- Faster commissioning reduces upfront costs, maintenance-free connections provide long-term savings.



Maintenance-Free

- Spring Pressure Connection Technology provides a secure connection via pre-programmed clamping force that adjusts automatically to the conductor cross-section.
- The spring compensates for conductor deformations (e.g., cold flows).
- The results are maintenance-free spring clamp connections.
- Contact problems can arise in screw connections due to material deformations.
- Furthermore, the electrical connection is only secure if the screw is tightened at the required torque.

Your Advantages:

- Maintenance-free Spring Pressure Connection Technology reduces service costs, leading to greater system uptime and reliability.
- Reduce costs by avoiding unnecessary downtime!



INCREASE SAFETY

Suitable for All Conductor Types

- CAGE CLAMP® spring pressure terminals are suitable for all conductor types: solid, stranded and fine-stranded conductors, as well as fine-stranded conductors with ferrules or pin terminals, and tip-bonded conductors.
- All conductors can be connected without any preparation: ferrules and pin terminals can be used, but are not mandatory.

Your Advantages:

- Eliminate time-consuming preparation – no ferrules or crimping required!
- CAGE CLAMP® spring pressure terminals are universal connections and can be flexibly used in all of your applications.

NaCl



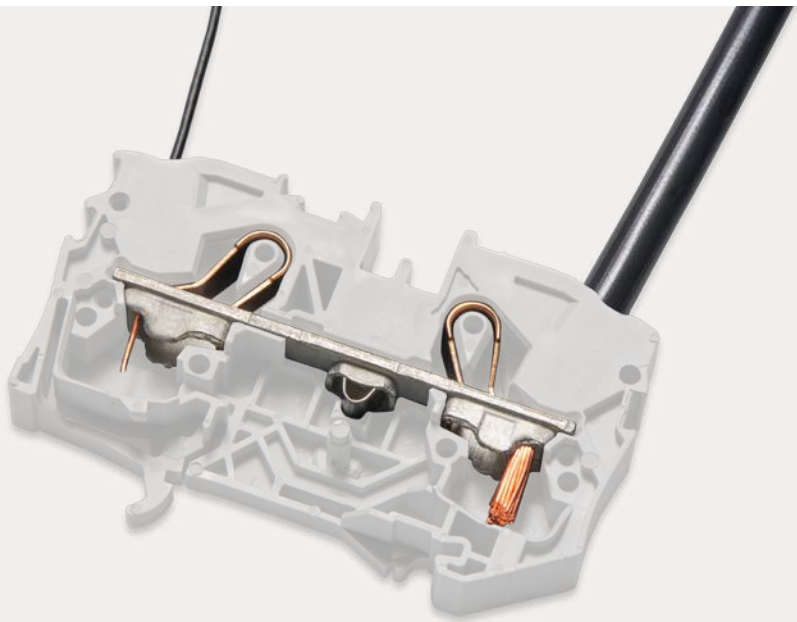
-35 °C

Reliable in All Applications

- Mechanical, electrical and environmental tests, as well as additional industry-specific tests, ensure that no interruption of the electrical connection will occur.
- CAGE CLAMP® spring pressure terminals pass all of these tests with no exceptions.
- The terminals satisfy the particularly high demands for rail vehicles (per EN 61373) and marine approvals (per GL, LR, DNV).
- For example, WAGO's TOPJOB® S Rail-Mounted Terminal Block System withstands shock tests up to 500g (common values are 15–25g) and tests in which extreme temperature changes from -40°C to +70°C are simulated (per EN 60068-2-14).

Your Advantages:

- Use WAGO products with CAGE CLAMP® technology in harsh environments anywhere in the world without hesitation!

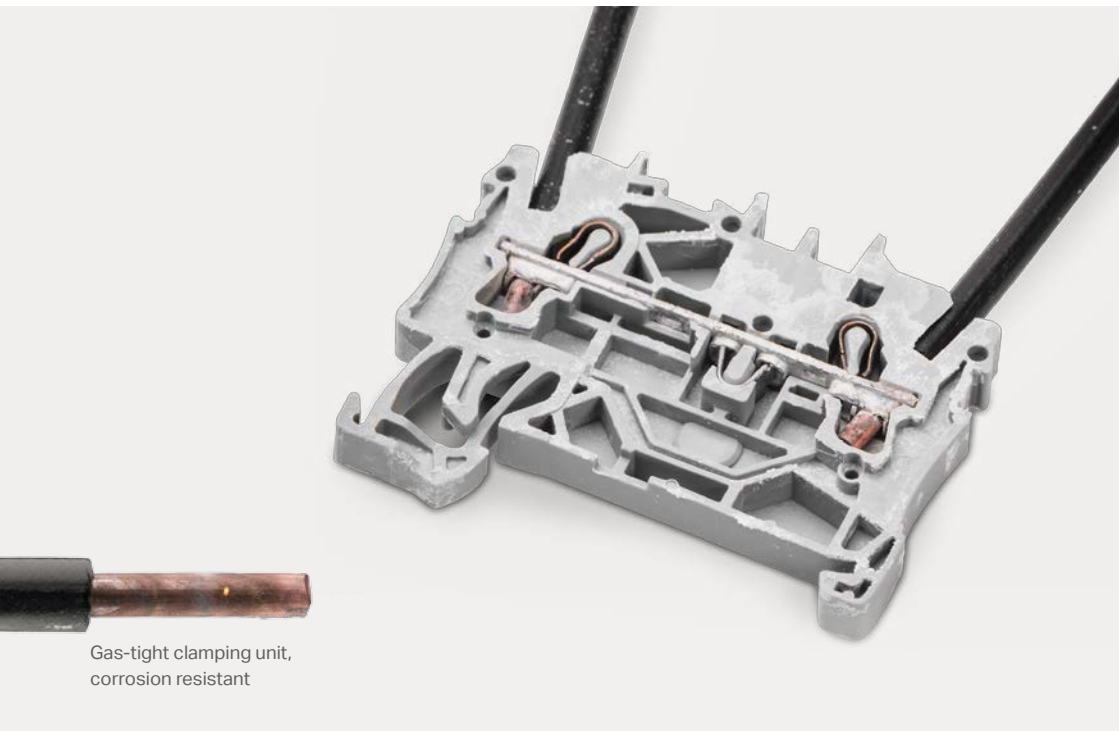


Clamping force adjusts
to the cross-section

INCREASE SAFETY

High Contact Quality – Independent of Operator Skill

- In addition to correctly selecting the materials and surface coating, the contact pressure [N/mm²] determines the quality of the clamping connection.
- The conductor is pressed against the current bar in a predefined contact area without damage.
- The contact zone is deliberately designed to be small and curved, not flat, in order to exert high contact pressure.
- The clamping force adjusts automatically to the conductor size.
- The clamp dynamically compensates for conductor deformation due to flow effects.
- A superior design eliminates the risk of a loose connection; contact breaks are excluded.



Gas-tight clamping unit,
corrosion resistant

- The conductor is embedded in a soft tin layer.
- The transition point is resistant to corrosive infiltration.
- The long-term consistency of the contact resistance is ensured – even in aggressive atmospheres.

Your Advantages:

- Profit from a secure connection regardless of the operator's skill!!

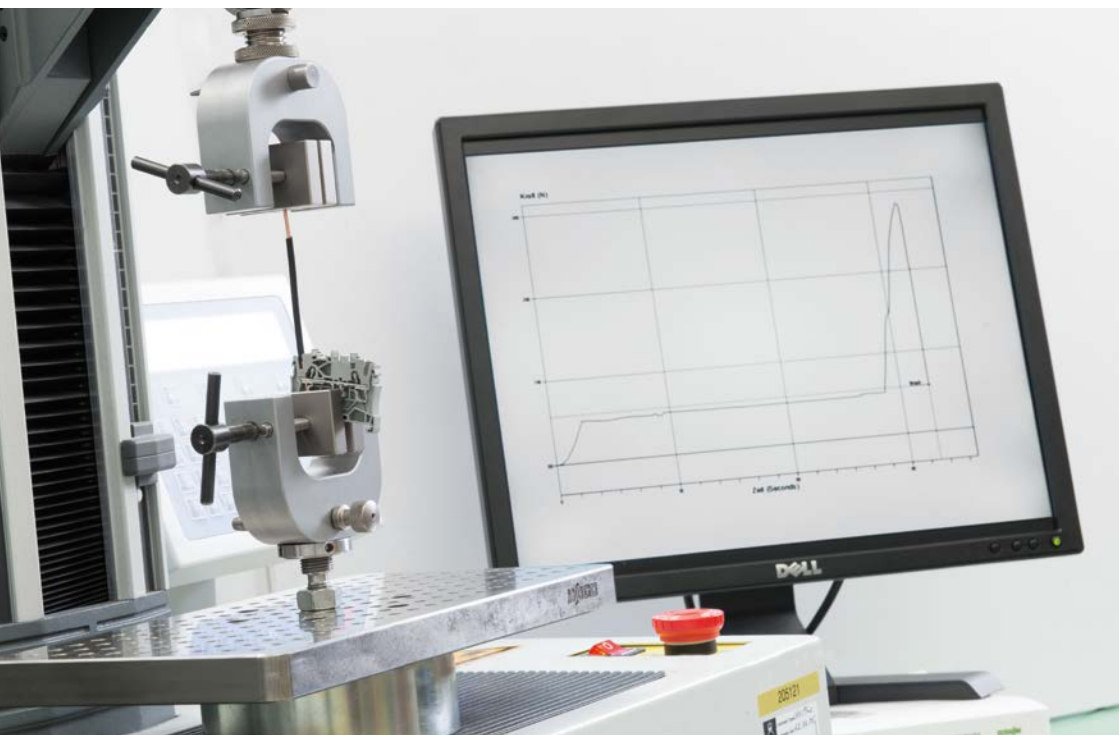


LABORATORY TESTS

Exceeding Minimal Testing Requirements

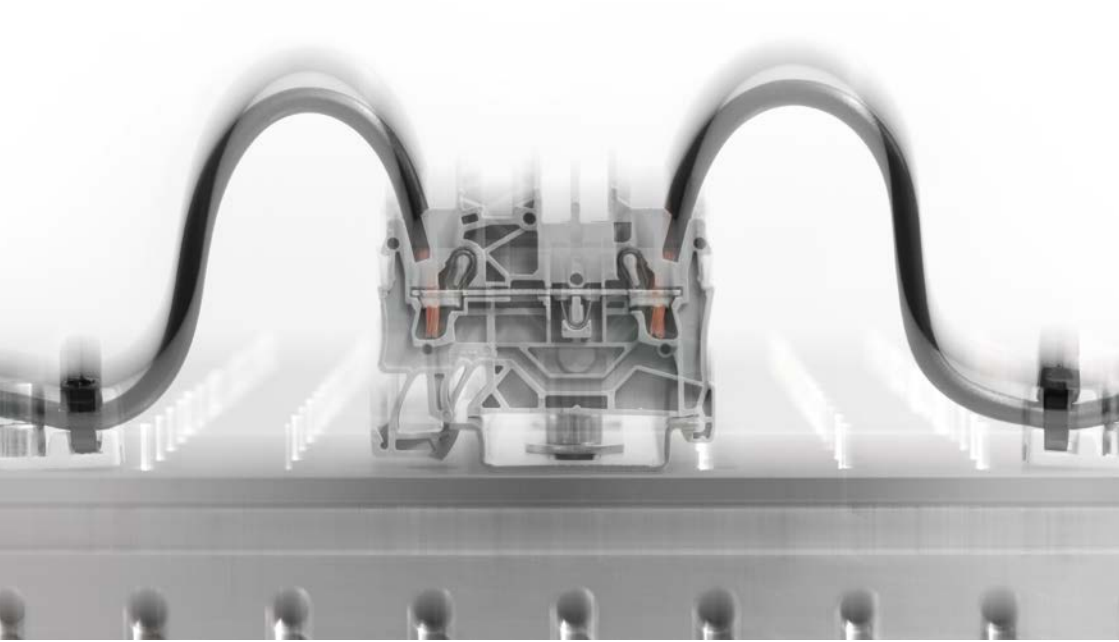
In order for terminal blocks to be used globally, they must satisfy certain standards (EN or IEC) and obtain additional test certificates (UL, GL, etc.) This is true for all manufacturers. In addition, WAGO conducts further testing that is inspired by actual applications to provide additional safety.

Thus, diverse mechanical, electrical and environmental tests are combined, a few of which will be described on the following pages.



**Pull-Out Test
(per EN 60947-7-1, EN 60998-2-2)**

- In the pull-out force test, a conductor is pulled on until it is removed from the clamping unit.
- The design of the terminals means that extraction only occurs after the standard pull-out force has been exceeded many times over.



LABORATORY TESTS

Vibration Test (per IEC/EN 60068-2-6)

- Depending on the application (e.g., railway per EN 61373, marine per GL, LR, DNV), there are various test requirements to determine if the long-term effects of vibrations degrade electrical connections.
- The test specimen is subjected to different loads on three axes in an electrodynamic vibration system.
- The amplitude, the acceleration and in particular, the frequency of the vibration vary during the test.
- The test values are increased many times over to meet special customer requirements.



Shock Test (per IEC/EN 60068-2-27)

- The shock test is very similar to the vibration test except that, instead of continuous vibrations, single shocks are applied to the test specimen.
- Shock tests are usually performed with an acceleration of 20g, for example, over a period of 11 ms.
- Tests for special requirements call for much higher values. For example, single-deck TOPJOB® S Rail-Mounted Terminal Blocks pass shock tests up to 500g.

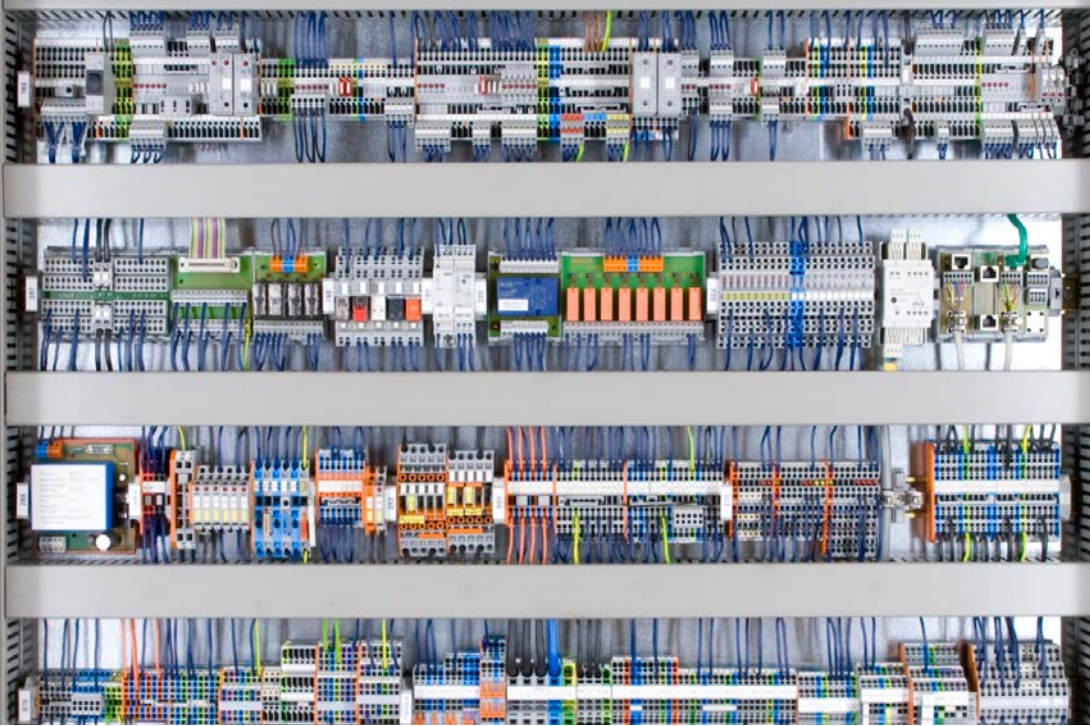


LABORATORY TESTS

Voltage Drop Test under Bending Stress

(per EN 60947-7-1, EN 60999-1)

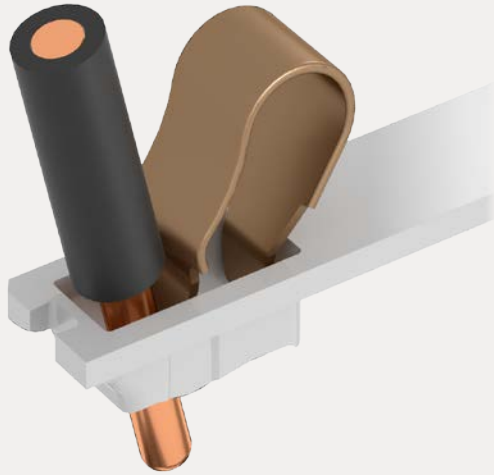
- The "Voltage Drop Test under Bending Stress" simulates mechanical stress on the clamping unit.
- In a practical application, this stress can occur during installation, e.g., when an electrician shoves connected conductors to the side in order to access to a specific component.
- The quality of the clamping unit when moving a connected conductor can be validated by the constantly stable measured value of the voltage drop.



PORTFOLIO

Highlighted Offerings from WAGO's Product Portfolio

- WAGO's product portfolio offers numerous components for use in a switch cabinet.
- From rail-mounted terminal blocks, through relays and optocouplers, power supplies, signal conditioners, up to automation components, and much more.
- In addition, WAGO's Spring Pressure Connection Technology is available in many other products, like circuit breakers or control and signaling units.

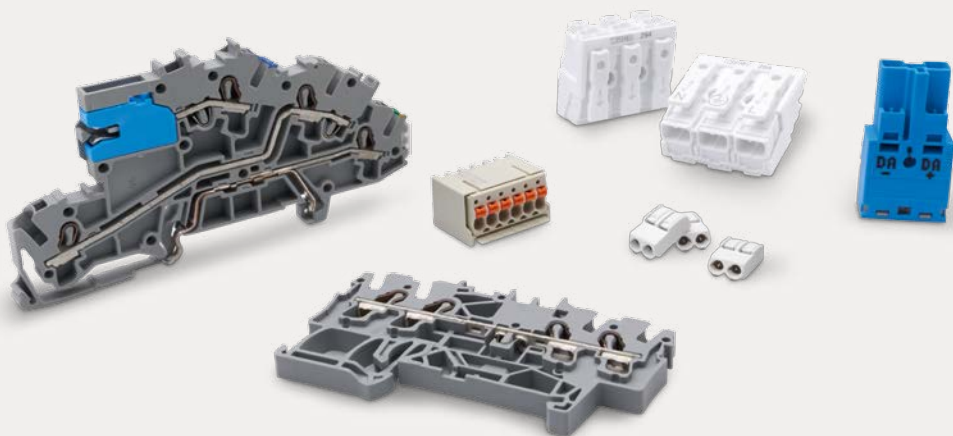


Push-in CAGE CLAMP®

The Universal Push-In Connection

- A conductor range from 0.14 to 25 mm²
- Push-in CAGE CLAMP® is the universal connection technology for all conductor types that provides the simplicity of push-in terminations.
- This rectangular “cage” is featured throughout WAGO’s vast portfolio of automation, electronic interface and interconnect products, such as on the busbar of TOPJOB® S Rail-Mounted Terminal Blocks.

PUSH-IN CAGE CLAMP®

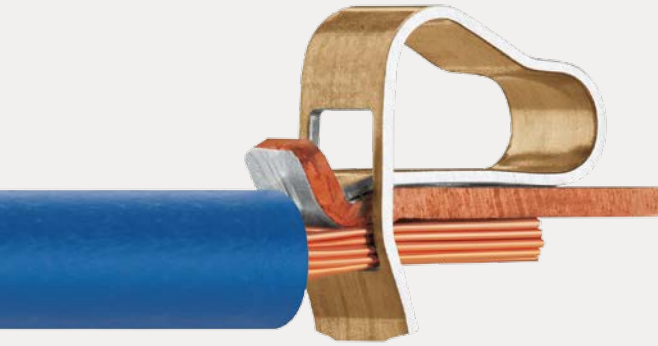


Easy to Use

This type of connection allows conductors to be terminated in two different ways:

1. Universal termination of all conductor types: Open the clamping unit using an operating tool, insert a conductor, remove the operating tool – done.
2. Push-in termination: Simply push a conductor into unit – done.
Terminate rigid conductors, such as solid, stranded and ferruled, fine-stranded conductors, by simply pushing them in – no operating tool needed.

An operating tool is always required to remove the conductor.

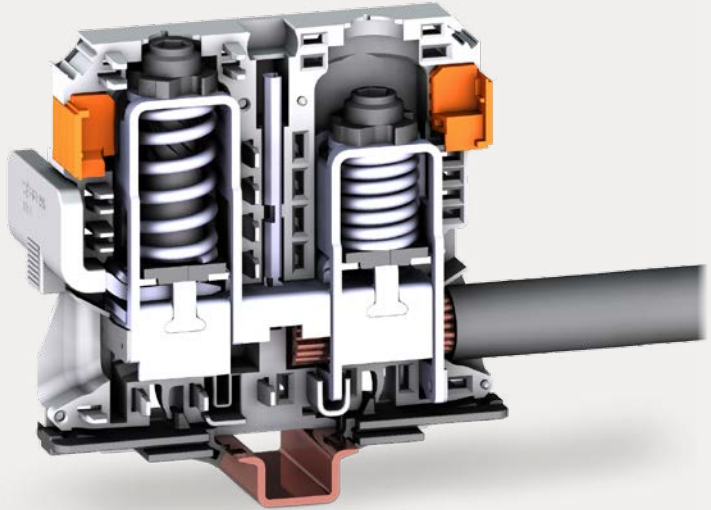


CAGE CLAMP®

The Universal Connection

- A conductor range from 0.08 to 35 mm²
- The clamping unit consists of two elements: the CAGE CLAMP® and a current bar.
- Together, they form a self-contained contact unit, which does not transfer any load to the insulation housing.
- The CAGE CLAMP® is made of high-quality chrome nickel spring steel. The current bar consists of electrolytic copper and has a mixed tin surface.
- WAGO invented this connection technology in 1977.
- Today, it represents a global industry standard for electrical connection applications.
- Proven in billions of applications worldwide!

CAGE CLAMP®

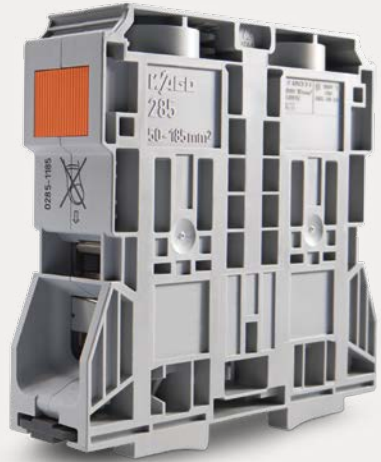


POWER CAGE CLAMP

The Universal Connection for Large Conductors

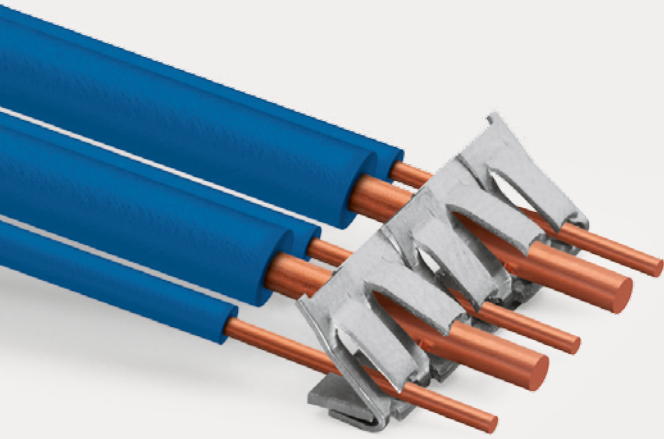
- A conductor range from 10 to 185 mm² (350 kcmil)
- Connect 185 mm² (350 kcmil) conductors via spring pressure – only WAGO can do this.
- A T-wrench transmits the rotational movement to the cylindrical clamping bolts, which are made of insulating material.
- This compresses the spring and opens the clamping unit.
- The clamping unit can be locked in its fully open position to facilitate conductor connection.

POWER CAGE CLAMP



Easy to Use

1. Rotate the T-wrench counter-clockwise to the stop.
2. Next, push in the orange locking tab. The clamp is locked open for hands-free wiring.
3. Insert a stripped conductor into the clamping unit until it hits the backstop.
4. A short counter-clockwise movement closes the clamp, securing conductor.



PUSH WIRE®

PUSH WIRE® Connection

- This connection technology is designed for solid or stranded conductors.
- The rigidity of the conductor itself is used to overcome the contact force of the clamping spring by simply pushing in the conductor.
- A laminated clamping spring is mounted on the copper current bar.
- The design ensures that every conductor is clamped in a separate clamping unit.
- The funnel-shaped conductor entry prevents inadvertent connection of multiple conductors in one clamping unit.
- PUSH WIRE® technology is widely used in junction box connectors.

PUSH WIRE®



Easy to Use

1. Sufficiently rigid solid and stranded conductors can be inserted directly – without tools.
2. Remove the conductor by simultaneously twisting and pulling the conductor.

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