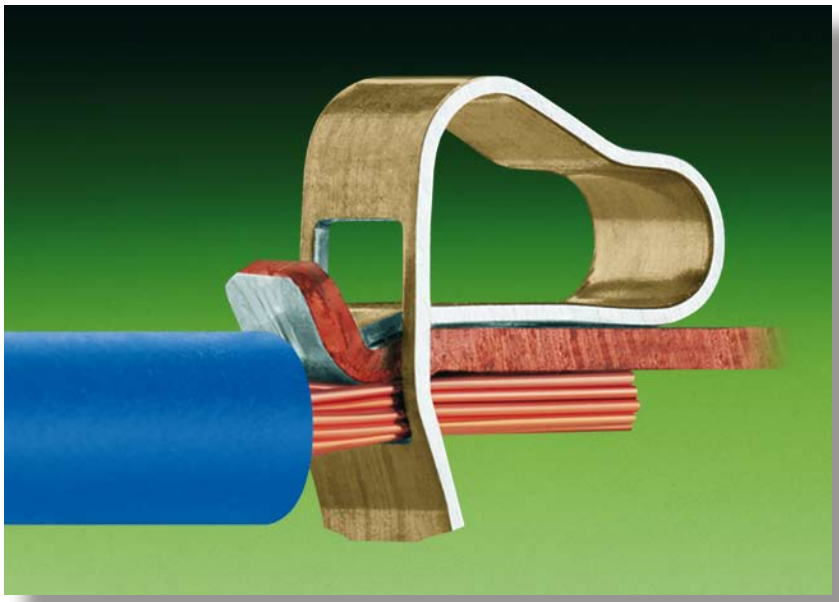
Applications Guide for Installers

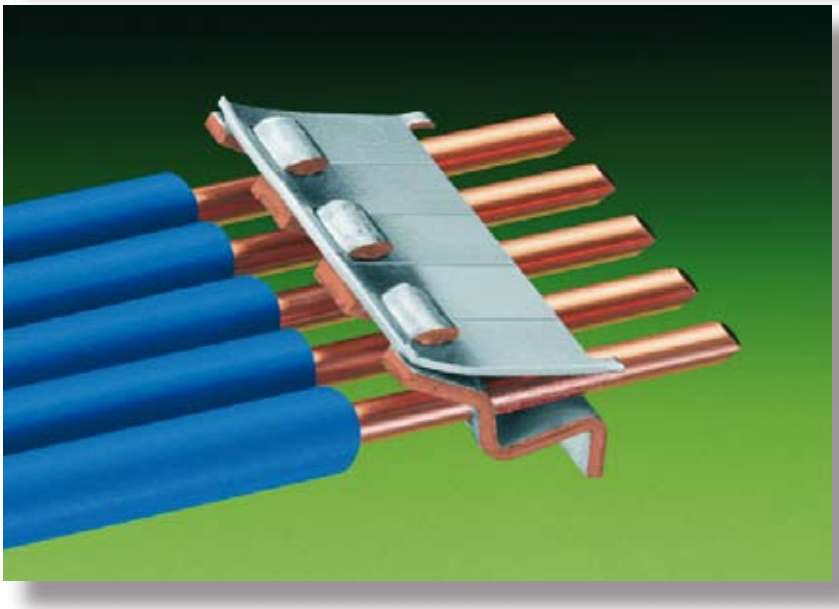
WAGO®
INNOVATIVE CONNECTIONS

Setting standards for over 50 years

WAGO has built a reputation over more than 50 years for providing innovative interconnection technology solutions. As creators of the mould-breaking Cage Clamp® and PushWire concepts, our existing family of almost 20,000 products is by far the largest range of spring pressure-based systems on the market, covering building services, industrial automation and utilities applications.

Throughout the UK, WAGO is able to offer electrical planners, consultants, contractors and facilities managers access to our extensive range of products and technical expertise. This includes working closely with the customer to devise tailor-made solutions for any type or size of project. We can also make available the extensive resources of our world-class R&D division.





An innovative approach to connection technology

Cage Clamp® is a universal clamping system for solid, stranded, fine stranded and ferruled conductors with a range from 0.08 – 35mm². It reduces wiring time and guarantees a gastight and maintenance free connection – every time. The automatic clamping feature ensures a precise, uniform contact is made between the conductor and current bar, regardless of operator skill.

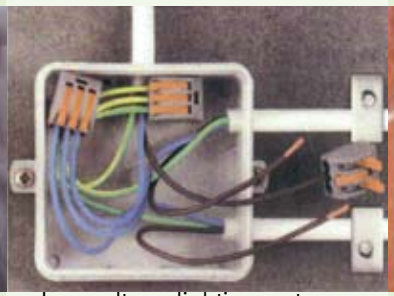
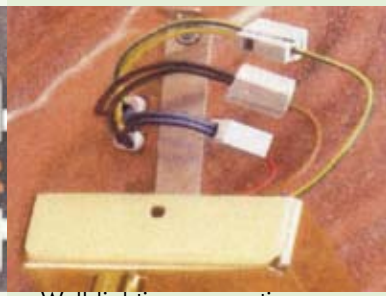
PushWire, like Cage Clamp®, ensures gastight and maintenance free connection. PushWire connectors are used exclusively for solid and 7 stranded conductors ranging from 0.75 – 6mm². The design ensures that every conductor is clamped in a separate clamping unit along the current bar.

Supporting best practice

OUR PRODUCTS ARE COMPLIANT WITH THE ELECTRICAL EQUIPMENT REQUIREMENTS OF BS 7671 (16TH EDITION)

WAGO's success is based on an in-depth understanding of market needs. Our products have been developed following extensive research and consultation with customers as well as with global testing and approvals bodies. Our products and systems meet the most stringent UK and international standards including the electrical requirements of BS7671. That means installers can be totally confident that using WAGO enables them to follow 'best practice' procedures and fully comply with the most up to date safety criteria.

For which applications can you use WAGO?

				
		773 series	**222 series**	**224 series**
Lighting		✓	✓	✓
Power		✓	✓	✓
Alarms & telecoms		✗	✓	✓
Heating & ventilation		✓	✓	✓
Control circuits		✓	✓	✓
Wire options	Solid	✓	✓	✓
	Stranded	✓	✓	✓
	Flexible	✗	✓	✓
Example				
Applications		• Junction box in ceiling, wall or floor • Low voltage lighting system • Wall mounted consumer unit • Power distribution	• Low voltage lighting system including uplighters and downlighters • HVAC control circuit • Junction boxes in wall or ceiling • Mobile homes	• Wall lighting connections • Ceiling rose for pendant lighting • Power & lighting connections on exhibition stand • Extending and looping conductors
Notes		Connectors should be used within a suitable enclosure. There is no requirement to secure the terminal blocks providing the cables are glanded or secured outside the enclosure with clips/saddles. IP20 protection on connectors. (See fig 6 page 9)	Connectors should be used within a suitable enclosure. There is no requirement to secure the terminal blocks providing the cables are glanded or secured outside the enclosure with clips/saddles. IP20 protection on connectors. (See fig 3 page 9)	A ceiling rose can act as the enclosure for these connectors as long as conductors are secured. Easy way of connecting flexible to flexible or solid to flexible conductors. Replaces crimp and twist connections. (See fig 4 page 9)

			
243 series	**862 series**	**TopJob®S**	**WINSTA®**
✗	✓	✗	✓
✗	✓	✓	✓
✓	✓	✗	✗
✗	✓	✓	✓
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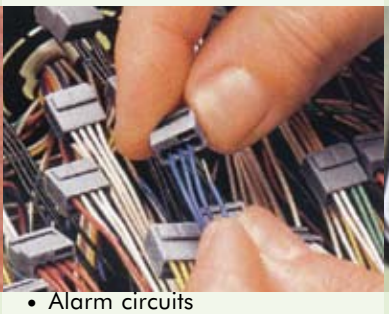	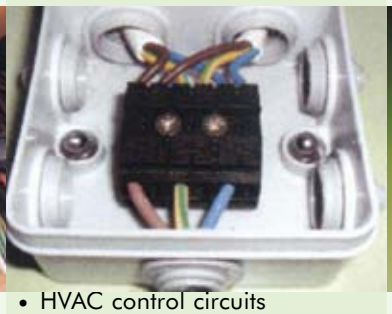	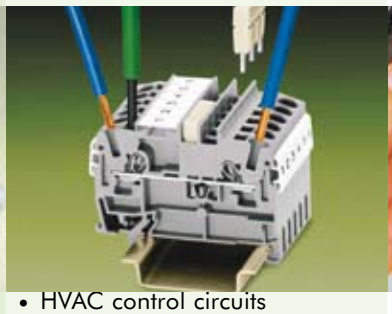	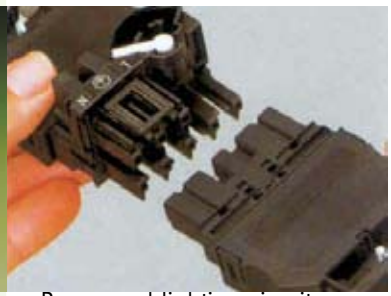
• Alarm circuits • Telecom systems	• HVAC control circuits • White goods control • Industrial washing systems • Ceiling mounted light fitting	• HVAC control circuits • Control circuits • Power distribution • Commoning of neutral or earth connections	• Power and lighting circuits • Lighting fittings & controls in ceilings and walls • Power circuits in wall or floor mounted trunking • Underfloor wiring of electrical systems
Push in connection of small solid conductors. Their size makes these connectors ideal for alarm and telecom applications. Can be mounted on adapter in junction box. Can be assembled together and commoned.	Connectors should be used within a suitable enclosure. The 862 Series can be fixed with self tapping screws or pins. Cables should be secured outside the enclosure with clips/saddles or cable glands. IP20 protection on connectors. (See fig 6 page 9)	DIN rail mount terminal for use in enclosures or cabinets. Easy push-in connection of solid or ferruled conductors, screwdriver operation for stranded and flexible. Safe commoning and test options. Jumpers and testing.	Plug and socket connector system reduces installation time. Easy connection of loose or pre-assembled parts. Can be used in wall or underfloor trunking or for point to point wiring of ceiling lighting.

Technical specifications for installer products

WAGO products for building services applications combine optimum performance and dependability with speed of installation. We offer a rapidly expanding range of wiring and intelligent control solutions for all types of commercial, retail, municipal and industrial applications. Whether it's a simple series of connections or a complex integrated building-wide network, WAGO products ensure installation and performance benefits unsurpassed by any other manufacturer.

222 Series

Junction Box Connectors (Cage Clamp®)

Cage Clamp® connection means that these 3 and 5 pole connectors will safely accept 0.08mm² to 2.5mm² solid and stranded conductors as well as 0.08mm² to 4mm² flexible conductors. Operation is easy using one of the integrated orange levers that locks open, ensuring that the clamping unit is ready for insertion of the stripped wire. Closing the lever, flush with the connector housing, ensures a gastight conductor connection. Wires are thus connected or removed without using any tools. There is a test point in the housing. The rating for this compact connector is 400V, 32A.

773 Series

Junction Box Connectors (PushWire)

Available in 2, 4, 6 and 8 pole, these colour coded connectors are suitable for 0.75mm² to 2.5mm² solid and 1.5mm² to 2.5mm² stranded conductors. The new 3 pole version is suitable for solid and stranded conductors from 1.5mm² to 6mm². Simply pushing the stripped conductor into the connector makes the connection; the transparent housing, a feature of all the connectors in the range, provides a visible indication that the conductor is secure. There is a test point in the housing. The conductors are removed by holding the wire and twisting left/right while pulling on the connector, which means the connector can be re-used. Also available is a fixing carrier that is designed to secure the connectors into a junction box or onto DIN rail. The rating is 400V, 24A (41A for 3 pole version). (See fig 1 page 9)

224 Series

Lighting Connectors (PushWire/Cage Clamp®)

These connectors combine PushWire and Cage Clamp® technology, making them ideal for lighting applications. There are three versions in the range, two with PushWire and Cage Clamp® connection suitable for 1mm² to 2.5mm² solid conductors and 0.5mm² to 2.5mm² solid, stranded and flexible conductors. The stripped solid conductor is simply pushed in one side while the stripped flexible conductor is inserted by compressing the terminal housing. The third version has Cage Clamp® connection both sides, accepting stripped solid, stranded and flexible conductors from 0.5mm² to 2.5mm². Again, the stripped conductor is easily inserted when the terminal housing is compressed. Operation is very easy and quick with no tools required, yet gastight connection is guaranteed. The rating of these connectors is 400V, 24A. There is a test point in the housing. (See fig 4 page 9)

243 Series

Junction Box Connectors (PushWire)

The WAGO 243 series MICRO PushWire connectors are designed for small solid conductors of 0.6mm to 0.8mm diameter. Available in 4 or 8 pole in four different colours, they are very compact yet easy to use. The conductors are removed by holding the wire and twisting left/right while pulling on the connector. Modular in design, these connectors can be assembled onto strips using the groove on the top, with each pole effectively having 4 or 8 connections. They can then be commoned by inserting a short solid conductor. There is a test point in the housing. The rating of 100V, 6A is ample considering the size of the connector itself. Also available is a fixing carrier suitable for 4 or 6 connectors that can be either DIN rail or panel mounted.

TopJob®S

DIN Rail Mount Terminal Block (Cage Clamp®)

The new leader in compact DIN rail mount terminal blocks, TOPJOB®S from WAGO is available in 2, 3 and 4 conductor versions for conductor sizes from 1.5mm² to 16mm² and rating ranging from 18A, 800V to 76A, 800V. The Cage Clamp®S connection technique allows stripped solid conductors to be pushed in, which is a significant cost and time saving benefit, while stripped stranded or flexible conductors are inserted by using a screwdriver to open the clamp. With their space saving design, these terminal blocks are up to 30% smaller with a conductor entry angle of less than 15° which allows easier installation in confined spaces. The comb type jumper system is based on the plug and socket principle with each terminal having a spring loaded socket in the current bar. Two slots enable alternate and staggered jumpering. Testing is carried out using the jumper socket for the test adapter, test tap or modular test connectors which are unique to TOPJOB®S terminal blocks.

862 Series

Terminal Strip (Cage Clamp®)

Available in 2, 3, 4 and 5 pole, these terminals have Cage Clamp®S connection, which allows up to 4 conductors to be connected with cross sections from 0.5mm² to 4mm² per pole. Different cross sections of solid, stranded or flexible conductor can be used in one terminal block. Safer and more reliable than the old fashioned "chocolate block", stripped solid conductors can be pushed in while stripped stranded or flexible conductors are inserted by using the pushbutton, either with a screwdriver or by hand. There are several different fixing options including screw and nut fixing from the top, fixing with self tapping screw from top or bottom and fixing with integral snap in mounting feet. In addition, the 3, 4 and 5 pole versions are available with optional automatic earth contact. The terminal blocks are pre-marked for easy identification and each pole has a test point. The rating of these terminals is 500V, 32A. (See fig 5 page 9)

WINSTA®

Plug and Socket Connector System (Cage Clamp®)

WINSTA® is a modular wiring system incorporating Cage Clamp®S technology, offering efficiency and simplicity for all types of building installations. The 3, 4 and 5 pole plug and socket components have two conductor entries per pole, thus enabling the independent connection of different size solid, stranded or flexible conductors from 0.5mm² to 4.0mm² in the same pole. WINSTA® connectors are rated at 25A, 250V (3 pole) / 400V (4 & 5 pole) making them ideal for lighting and power applications. The Cage Clamp®S connection allows stripped solid conductors to be pushed in while stripped stranded or flexible conductors are inserted by using a screwdriver to open the clamp. The range extends to the wiring and interconnection of systems with snap-in type and distribution connectors with optional phase selection for the symmetrical loading of three phase systems. Whether prepared on site or pre-assembled for special projects, these connectors make handling and cable preparation considerably easier and can reduce wiring installation time by up to 70%.

Preferred practices regarding terminations

What are the key issues surrounding compliance with NICEIC procedure and BS7671 (16th Edition) wiring regs?

Typical questions asked by installers	
Should WAGO connectors be used in an enclosure?	In order to comply with the requirements of the 16th Edition of the IEE Wiring Regulations/BS7671, all connectors should be used in a suitable enclosure of material complying with the relevant glow-wire test requirements of BS 458-2.1. (Fire hazard testing for electrotechnical products). This will provide mechanical protection for the connectors as well as protection against dust, damp and accidental damage. Although WAGO connectors are IP20 (finger touch) with Polyamide 6.6 housing for strength and durability.
Do they need to be fixed in an enclosure?	The junction box connectors do not have to be fixed down in the housing provided that the cables are secured on their way into the box. However, fixing provides a more secure and professional looking finish. (See figs 2 and 3, page 9)
Does there need to be strain relief on the cable?	Yes, there should be strain relief on the cable. This could be the cable clipped outside the enclosure or cable glands within the enclosure to prevent the cables being pulled out of the connectors. (See fig 6)
I'm used to screw connections - how secure is your clamping system?	The WAGO Cage Clamp® and PushWire clamping systems guarantee gas-tight, maintenance-free connections every time. Our connectors incorporating these proven technologies have been used in industrial and building services applications worldwide. The company's reputation is built on the high quality and proven performance of our products. For installers, this ensures complete peace of mind. (See page 2)
How do I release the conductor from the terminal?	All WAGO connectors are re-usable. PushWire conductors are removed by pulling the conductor and twisting the connector. Cage Clamp® connections are released by using a screwdriver or pushbutton/lever operation. (See figs 1, 4 and 5, page 9)
Do your connectors comply with British Standards?	BSI recognise and harmonise with IEC 60947, 60998 and 60999. These are European standards which relate to terminal blocks and connectors. All WAGO products conform to these standards and other international requirements.
What other standards do your connectors comply with?	WAGO sells its products worldwide and is therefore in constant contact with testing and approvals houses around the globe. See page 11 for full list of appropriate bodies.
There's a small cavity in a ceiling, wall or floor. Can a terminal block be fitted without the need for an additional back box?	Yes. When installing backless equipment, such as a domestic style luminaire, it is possible for the enclosure to be formed or completed with building material considered to be non-combustible when tested to BS 476-4. (Fire tests on building materials and structures. Non-combustibility tests for materials). Where there is any doubt that the building material does not meet this standard, the electrical connections should be shielded from the fabric of the building by a suitable electrical back-box.

Summary of preferred practices to ensure WAGO series products are used in accordance with NICEIC procedure and BS7671 wiring regulations

- All connections must be used in an appropriate BSI/IEC approved enclosure to provide protection of equipment against certain external influences (dust/damp) and in any direction protection against electrical contact
- The normal installation (electrical) has many joints and it follows that these must all remain safe and effective throughout the life of the system.
- All junction boxes must be accessible for inspection and testing unless they are buried in compound.
- Every connection between conductors and equipment shall provide durable electrical continuity and adequate mechanical strength. *WAGO's Cage Clamp® is vibration proof and thermal loosening free. High quality metal and material parts are used.*
- Where sheathed cables are used, the sheath must be continuous into the enclosure. The cable secured via cable glands or clips. (See fig 6)

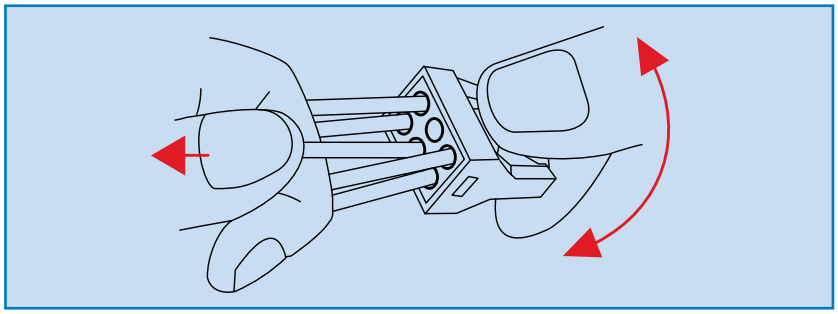

Fig 1

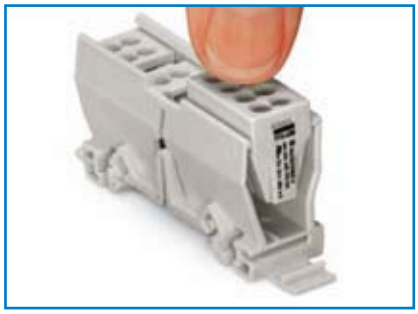

Fig 2

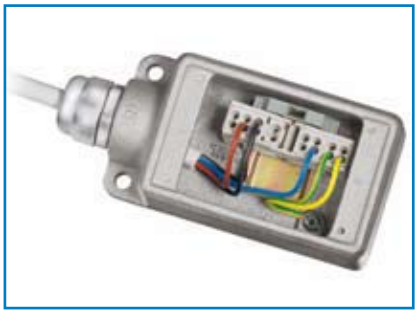

Fig 3

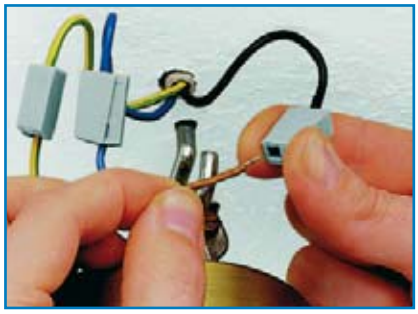

Fig 4

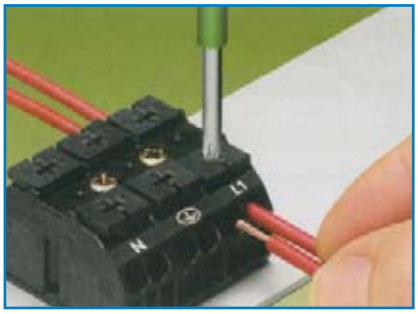

Fig 5

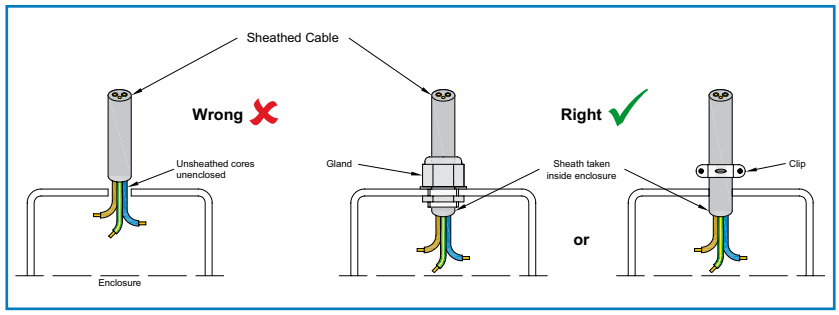

Fig 6

What the industry says about WAGO

"We have confidence in using WAGO connectors on a regular basis in our control panels. The Cage Clamp® technology which is incorporated across the product range offers our clients maintenance free, fast and easy connections and saves us considerable build and installation time.
Roy Black, ***Director, Kim Systems***

MK Electric works closely with WAGO and we use their connectors within the MK Flexible Wiring System. To meet the needs of the rapidly growing off-site building sector, innovative solutions and products are required and, as the market leader in spring clamp technology, WAGO plays an important role.
Philip Redman, ***Business Manager, MK Wiring Systems***

When looking for a system partner to provide creative innovation in pluggable systems for building installations, WAGO was our obvious choice. Their enthusiasm, flexibility and quality products have brought time and cost savings to every project.
David Lewis, ***Managing Director, APEX Solutions***

WAGO has the proven experience in interconnection technology and the manufacturing strength to ensure high quality, dependable terminal blocks every time. We believe this makes an important contribution to our product offering."
Bill Coates, ***Engineering Manager, Airedale Air Conditioning***

List of approvals

Our partners

We have established close working relationships with many of the world's leading manufacturers of lighting and power distribution equipment. As a result, WAGO's modular wiring units, connectors and software solutions have been incorporated into many of today's leading edge products and are making a vital contribution to system performance and reliability.

Please contact WAGO if you need more detailed information on any of the products shown

Choose WAGO for peace of mind

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