GOING SCREWLESS

WHY THE END OF THE SCREW COULD BE NEAR FOR PANEL BUILDERS

A WHITE PAPER BY WAGO

Time-conscious panel builders and system integrators are under pressure to complete jobs quickly and to a high standard, as well as add value through innovative thinking and new technology deployment.

A critical component of any panel building system - wire connection within terminal blocks - is a fundamental element for safe, reliable and high performing electrical solutions for panel projects.

Often thought of as an insignificant part of the overall system, poor or failing wire connection can have serious repercussions and prompt issues that lead to unwanted downtime, expensive lost production and other avoidable and costly problems.

Suppliers, product designers, clients, integrators, end users and maintenance teams all still commonly specify and use screw-based methods for wire connections because of their perceived advantages and sometimes because antiquated standards dictate it.

A recent survey into screwless vs screw DIN Rail mounted terminals found that **56% of panel builders have experienced loose connections from screw terminals**. However despite this, there remains a short-term, but commonly held view, that using conventional screw connection is the preferred method for achieving the desired level of wire connection within terminals.

But, this belief can lead to operational problems and is one that needs to be strongly challenged by a proven and high performing alternative solution – screwless technology.

Screwless technology offers a range of benefits, which when combined, become a powerful advocate for its specification. It is already in place across millions of applications around the globe, as users have benefitted from reduced wiring timescales, the elimination of routine maintenance responsibilities and the peace-of-mind that results from knowing a reliable, vibration-proof contact has been achieved.

SPEED IS THE KEY

According to several public wiring competitions and major customer time studies, **screwless technology was found to be up to 264% quicker to install wiring** within terminal blocks, when compared with screw clamp connections.

This is primarily because of screwless technology's ease of use. Fitting accessories such as a jumper to common terminals is simply a case of pushing it firmly into place. There are no link bars to fit or a myriad of screws to tighten.

REMOVE THE VARIABLES - Users can often be left with a quandary when it comes to the installation of screw connections. While they must turn the screw to tighten and loosen the clamp, they need to question areas such as the level of tightness applied and the correct tool to do it. Final connection success will depend on variables such as the strength of the person and the torque screwdriver being used, if indeed a torque screwdriver is.

It has been found that **24% of panel builders have been recalled to fix a panel due to a loose connection** which raises the question of whether the right level of torque has been applied to the connection. To safeguard against this issue and minimize downtime, it is always recommended to follow the torque recommendation from the manufacturer and use the appropriate tool which will validate any warranty claim.

However, in the case of screwless technology there is no longer a requirement for any specific tool. Users only need a screwdriver shaped operating tool to open the clamp. Indeed, depending on the type of terminal block, some even have a spring design which allows for solid or ferruled conductors to be pushed straight into the terminal. The possibility of damage through over tightening or a loose connection is therefore eliminated and important variables that could lead to system faults removed forever.

RELIABLE PERFORMANCE - Screwless cage connection terminals are always ready to use but can never be overused. Manufactured from stainless steel, the spring mechanism cannot be over stretched because of the stops built into the moulding of the terminal block. It is not possible to over stress it.

As it is a spring, if the equipment is installed in an environment that is subjected to vibration, then it will always keep the conductor clamped securely against the current bar in the terminal block. This is a big advantage for many applications placed in aggressive operating environments, as well as overcoming the potential shock and vibration problems that could result from the transportation of panels to their final locations.

FIXING OPTIONS - With screw connection, it is an accepted practice to put two wires into one clamp to join them together. Whether the wires are twisted together or inserted separately, there is no guarantee that both conductors will be properly clamped. Most of the screwless type DIN rail mount and panel mount terminals, as well as junction box connectors, are available in two, three and four conductor versions which individually clamp each conductor safely.

It could be argued that individual clamping makes the terminal larger and space is not always available, but top entry and double deck terminals increase connection density on a DIN rail or in a junction box.

VALUE OVER THE LONG-TERM - The initial purchase price of a screw type terminal may well be lower than a similar screwless type, but that should only be a part of the consideration.

With any sort of connection, it is not just the purchase cost, but also the cost of installation, wiring and maintenance, that must be considered.

Routine maintenance of some types of screw connection is required to make sure they have not loosened over time. However, the clamping force of a screwless technology connection will not reduce regardless of how long it has been installed or the temperature (within a wide operating range) in which it must operate.

DO YOUR HOMEWORK - Not all connectors and terminal blocks are the same.

It's easy to think that it's "just a connector", so what is all the fuss about? Yet, how many times has a system failed due to an incorrectly or poorly terminated conductor?

The first thing to check is that the terminal is the correct size for the conductor. Secondly, assess what current rating is required for this application. Thirdly, ensure the insulation has been stripped back to the correct length to ensure it is not clamped.

It is surprising how many times such fundamental considerations are overlooked, leading to the potential for issues that result in downtime and the deployment of expensive resource to rectify a totally avoidable situation.

The quality and reliability of the connection is paramount in any application, not only in the connection method and technology, but also with the materials used. Modern connectors and terminal blocks are made using the highest quality materials and comply with, and in some cases exceed, the requirements of international standards.

Assessing the advanced range of screwless terminal blocks and connectors on the market clearly demonstrates that screwless connection technology can be simple, innovative and dependable, helping panel builders to achieve wire connection success without delay or compromise. Not only this, but with **36% of panel builders facing a lack of new entrants and low retention in the industry**, the simplicity of screwless technology can help address this skill-gap and protect the reputation of their business.

By taking a fresh look at 'going screwless' panel builders can connect with the millions of other applications which are today benefitting from the undoubted advantages it is providing.

WHY WAGO? - WAGO has the largest range of lever, push-button and operating slot screwless terminal blocks and connectors on the market, ensuring that DIN rail mount terminals, PCB terminals, junction box connectors, relays, terminal strips, modular wiring systems, PCB connectors and automation equipment, are all available worldwide for the same applications as screw connection.