

COMPLIANCE OR CONVENIENCE: THE HIDDEN CRISIS IN SOUTH AFRICA'S BUSWAY MANUFACTURING AND SUPPLY INDUSTRY

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A market in disarray

South Africa's busway (busbar trunking) manufacturing and supply industry is experiencing a quiet but increasing crisis. Technically, the sector adheres to SANS/IEC 61439-6, which provides detailed standards for low-voltage switchgear and control gear assemblies — including busway systems.

In reality, however, non-compliance is becoming normalised. Products that should be tested, certified, and traceable under SABS and IEC standards are being replaced with cheaper, often untested alternatives. The result is an industry plagued by vague specifications, uneven competition, and compromised safety — all made worse by the lack of accountability among professional bodies responsible for ensuring compliance.

As contractors, we often find ourselves amidst this chaos — trying to balance cost, compliance, and client expectation in an environment that increasingly rewards the wrong priorities.

SABS-approved, yet sidelined

One of the most troubling trends is the systematic sidelining of SABS-approved and ISO-certified manufacturers. Companies that invest heavily in full compliance, continuous testing, and certification — including products bearing the SABS mark of approval — are losing out to suppliers offering cheaper, partially tested, or non-tested products.

Many of these so-called "type-tested" systems rely solely on limited tests, such as temperature rise or short-circuit withstand, without undergoing the full suite of verifications required by SANS/IEC 61439-6. In some cases, type test certificates are outdated, irrelevant, or issued for configurations that differ completely from the intended product.

This raises a vital question:

Should type test certifications have an expiry date — similar to a Certificate of Compliance (COC)?

As technology develops, materials evolve, and manufacturing methods change, it is unreasonable to assume that a test conducted ten years ago remains valid today. Perhaps it is time for regulators and industry bodies to review this and implement stricter validity periods and re-certification requirements for type-tested systems.

The tender trap: when vague specifications breed non-compliance

The tendering environment is another area where the system is breaking down. Many tender documents are vague, generic, or incomplete, merely stating "busbar system including all accessories to be provided" without specifying compliance to SANS/IEC 61439-6. A compliant manufacturer may quote for items deemed necessary based on the standards, while a non-compliant or barely compliant manufacturer might



not. It is important to note that the difference in products will also result in overall cost differences. Without a detailed bill of quantities or clear specifications, it is not possible to ensure a fair adjudication.

This lack of precision shifts responsibility onto contractors, who are then compelled to compete

mainly on price. In a competitive bid environment, cost almost always prevails — and compliance becomes optional, variation orders are deemed necessary, and budgets become limited.

The result? Contractors procure products from busbar

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The importance of regular fire system maintenance



Regular maintenance should be viewed as an investment.

Fire detection and suppression systems are designed to respond quickly during an emergency, often within seconds of an incident occurring. However, their reliability depends not only on proper installation but also on regular inspections, testing, and maintenance. Without these, even the most sophisticated fire protection system can fail when it is needed most. For property owners across South Africa—whether commercial, industrial, or residential—scheduled fire system maintenance is not just a compliance requirement; it is an essential safety measure.

South African legislation clearly assigns

responsibilities to building owners and employers to ensure fire protection systems are properly maintained. The Occupational Health and Safety Act (Act 85 of 1993), along with relevant SANS standards like SANS 10139 for fire detection and alarm systems and SANS 1475 for fire extinguishers, specifies requirements for inspection, testing, and maintenance. Municipal fire by-laws further strengthen these obligations. Non-compliance can lead to legal liability, insurance issues, and, most critically, preventable loss of life.

According to Michael van Niekerk, CEO of ASP Fire, regular maintenance should be regarded as an investment in operational continuity rather than an administrative burden. "A fire system is only as effective as its last service. Detection devices can become contaminated, batteries can degrade, sprinkler heads can corrode, and control panels can develop faults over time. Without scheduled inspections, these issues often go unnoticed until it is too late."

Fire detection systems rely on accuracy. Smoke and heat detectors must function within designated sensitivity ranges. Control panels need to correctly interpret signals and activate alarms, evacuation procedures, and connected suppression systems. Routine testing confirms that detectors are properly calibrated, wiring is intact, communication channels are operational, and standby power supplies are dependable. In South

Africa's diverse environmental conditions, from coastal corrosion to dusty industrial environments, environmental factors can significantly affect system performance.

Suppression systems, whether water-based sprinklers, gas suppression, or specialised extinguishing agents, rely equally on regular maintenance. Valves can seize, pumps may fail, cylinders can lose pressure, and pipework can become obstructed. Scheduled servicing identifies and addresses these issues before they threaten system integrity. In high-risk environments such as data centres, manufacturing facilities, and healthcare institutions, even a brief delay in activation can lead to catastrophic losses.

Beyond compliance and risk mitigation, regular fire system maintenance safeguards business continuity. A fire incident not only endangers lives but can also disrupt operations for months, harm reputations, and cause significant financial losses. Insurers are increasingly demanding proof of ongoing maintenance in accordance with recognised standards. Inadequate records or missed inspections may compromise claims. Proactive servicing shows due diligence and bolsters an organisation's risk management profile.

Maintenance must be systematic and well-documented. "Scheduled inspections should be conducted by competent, accredited technicians in accordance with applicable SANS standards and manufacturer specifications. Each service must be recorded, with clear reports that highlight any defects and the corrective actions taken. This documentation is essential for audits, insurance, and legal

compliance," notes van Niekerk.

Regular servicing also provides an opportunity to assess whether existing systems remain suitable for the building's current use. Changes in occupancy, layout, storage methods, or equipment may shift the fire risk profile. What was sufficient five years ago might no longer meet current standards. Maintenance visits enable informed suggestions on upgrades, expansions, or technology improvements to ensure ongoing compliance and maximum protection.

Ultimately, fire protection is about prioritising people's safety. Early detection enables safe evacuation. Effective suppression limits the fire's spread, reduces smoke damage, and keeps escape routes clear. A well-maintained system provides occupants with valuable time to leave safely and allows emergency services to respond efficiently.

"Fire safety cannot be reactive," concludes van Niekerk. "It requires ongoing commitment. Regular maintenance ensures that when a fire emergency occurs, the system responds exactly as designed. That reliability saves lives and protects assets."

For property owners and facilities managers across South Africa, the message is clear: installation is just the beginning. Regular, scheduled maintenance ensures that fire protection systems perform their vital role. To keep fire detection and suppression systems compliant, reliable, and fully operational, ASP Fire provides a comprehensive maintenance assessment and customised service plan.

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manufacturers assuming they are getting the best quality at the best price, without verifying compliance. Compliant manufacturers who try to do the right thing by quoting on compliant products are undercut by non-compliant or partially compliant manufacturers, while those willing to cut corners are rewarded. The tender process, instead of promoting technical excellence and adherence to standards, encourages shortcuts and risk-taking. This is fundamentally unfair — and dangerous.

Friendship Over Compliance: A Culture Problem

The market has also been flooded by small, unregulated manufacturers, often started by individuals leaving established companies. Equipped with insider knowledge and industry contacts, many launch products that do not meet full SANS/IEC 61439-6 requirements — still gain acceptance through friendship-based business networks.

It has become far too common for projects to be awarded based on personal or political connections rather than on technical merit. This is especially concerning because these non-compliant systems are being installed in hospitals, shopping centres, data centres, and factories, where public safety should never be compromised.

In today's technologically advanced world, test reports and certificates can be easily altered. Without thorough verification — through SABS, NRCS, SANAS or other

accredited bodies — there is no assurance that a product is genuinely compliant.

Who Bears the Responsibility?

The lack of accountability within the professional hierarchy is one of the biggest enablers of non-compliance.

Consulting engineers and designers often copy old specifications or leave details vague, assuming contractors will "know what to do," or they place trust in a manufacturer, expecting to receive the best solutions and products.

Contractors, under pricing pressure, are compelled to interpret incomplete documents and make supplier choices and decisions that should be conducted by professionals.

Non-compliant or partially compliant manufacturers, driven by cost, seldom understand the risks of non-compliant systems until it's too late.

So, the question arises:

Who should be held responsible when non-compliant products are installed? Is it the professional engineer or consultant, the installation electrician signing off the project, the contractor who ordered and purchased the non-compliant or partially compliant product, or the manufacturer who deliberately supplied non-compliant or partially compliant products?

While all parties have obligations under the Occupational Health and Safety Act and Electrical Installation Regulations, the primary responsibility for specifying

compliant systems should lie with the Professional Engineer or Consultancy Firm. Contractors cannot and should not be expected to select suppliers based solely on price. Design integrity, clear specifications, and test parameters should always be specified by the responsible professional, and the supplier should be chosen based on the level of compliance. The manufacturer should ensure that they adhere to manufacturing regulations.

The Client's Cost Illusion

Many clients believe that choosing cheaper systems saves money — but the reality is quite different. A non-compliant busway system not only reduces the lifespan of the installation but also increases fire and safety risks, can invalidate insurance, void warranties, and expose the client to legal and financial consequences.

Compliance isn't a luxury; it's a safeguard. It protects lives, property, and reputations.

Professionals and contractors must take a stand and educate clients on the long-term costs of non-compliance. The SANS/IEC 61439-6 standard exists to ensure safety, reliability, and interoperability — and every deviation from it compromises that foundation.

Rebuilding Accountability and Integrity

The way forward is clear: accountability, transparency, and enforcement.

Every stakeholder in the value chain must

play their part:

- Professionals must specify, verify, and enforce compliance with SANS/IEC 61439-6.
- Contractors must refuse to install untested, non-certified, or partially certified systems.
- Consultants and engineers must insist on documentation, not assumptions.
- Regulators and certification bodies must take action against manufacturers who misuse type test reports or circumvent proper testing procedures.
- Compliance should not be a competitive disadvantage — it ought to be the industry standard.

Conclusion: Choosing Integrity Over Convenience

The South African electrical industry faces a crucial crossroads. We can keep neglecting standards, permitting outdated tests, unclear specifications, and non-compliant products to shape our market — or we can demand higher standards.

We owe it to ourselves, our clients, our employees, and our profession to maintain the integrity of SANS/IEC 61439-6. The expense of non-compliance exceeds the cost of doing things correctly.

It's time to shift the focus from convenience to compliance, from relationships to responsibility, and from price to performance. Only then can we rebuild trust, fairness, and safety in our industry.



EDITOR'S NOTE

Welcome to the April edition of **Sparks Electrical News!** As a new season begins, we are pleased to present an issue full of fresh insights and practical advice for professionals across the electrical sector. This month, our focus is on three main areas advancing innovation and dependability in the industry: cables and cable accessories, MCC and motor protection, and lighting.

We begin with a detailed examination of cables and cable accessories—the fundamental components for every electrical project. Our team explores new trends in cable technology, from innovative materials to intelligent cable management solutions that meet today's needs for efficiency and safety. With updates on standards, installation techniques, and

product innovations, we aim to help you make well-informed decisions for both routine and complex applications.

Our coverage continues with a focus on Motor Control Centres (MCC) and motor protection. As facilities aim to optimise performance and minimise downtime, effective motor control and protection systems have never been more important. In this issue, you'll find expert commentary on best practices for MCC specification, installation, and maintenance, as well as an overview of the latest protection technologies designed to safeguard your assets and ensure operational continuity.

Finally, we focus on lighting—a sector swiftly evolving with energy-efficient designs, smart

controls, and human-focused solutions. Our articles explore the latest product launches, lighting design strategies, and case studies from commercial, industrial, and residential projects. Whether upgrading existing systems or planning new installations, you'll find inspiration and practical advice to brighten your projects.

At **Sparks Electrical News**, we are dedicated to promoting excellence and supporting South Africa's electrical professionals with relevant, up-to-date information. We hope you enjoy this issue and find it both informative and empowering for your work ahead.

Minx Avrabos
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The critical importance of circuit breaker compliance

In South Africa's bustling industrial, commercial and residential sectors, circuit breakers are the silent guardians of every electrical installation. These compact devices safeguard wiring, equipment, and people from the destructive effects of overloads and short circuits. However, their ability to perform this life-saving function relies entirely on one non-negotiable factor: full adherence to applicable standards.

Compliance is not just a bureaucratic tick-box. It is the proven assurance that a circuit breaker will function exactly as intended under fault conditions. In South Africa, there are primary benchmarks for low-voltage switchgear and control gear, miniature circuit breakers (MCBs), and a relevant SANS standard for overarching regulations.

Understanding what makes a circuit breaker compliant is one thing, but why does this matter so much?

Safety first. A non-compliant breaker may fail to trip, allowing sustained arcing that can ignite insulation and start fires. Statistics from the Department of Employment and Labour and insurance loss-adjusters consistently show that substandard or counterfeit protective devices contribute to a disproportionate

number of electrical incidents. In an era of increasing load densities—from EV chargers and solar inverters to data-centre expansions—fault currents are higher than ever. Only compliant devices are tested to safely interrupt these currents.

Legal and financial protection. The Occupational Health and Safety Act (Act 85 of 1993) imposes strict duties on employers and electrical contractors. Using non-compliant equipment can make an installation illegal, expose the responsible engineer or contractor to personal liability, and invalidate insurance coverage. A single incident involving injury or property damage can lead to fines, litigation, and reputational damage that significantly surpass the modest premium paid for certified products.

Reliability and system longevity. Compliant circuit breakers maintain calibrated tripping curves throughout their service life. They coordinate properly with upstream and downstream devices, preventing nuisance tripping while ensuring selective disconnection. In critical applications such as hospitals, mining operations, and manufacturing plants, this selectivity keeps essential services online and

minimises costly downtime.

Technological relevance. Advanced functions are only reliable when the base device meets the latest edition of the relevant SANS or IEC standard. Retrofitting older panels with non-compliant replacements often creates coordination gaps that compromise the entire protection scheme.

Electrical professionals have a clear duty: specify, install, and maintain only certified circuit breakers. This involves checking test certificates, verifying the SABS or IEC markings, and insisting on documentation from reputable manufacturers. Regular inspection and testing in accordance with relevant SANS codes further ensure ongoing compliance.

In an industry where milliseconds separate normal operation from catastrophe, circuit breaker compliance is the foundation of professional integrity. It protects lives, safeguards assets, and upholds the reputation of every electrical practitioner. The cost of compliance is always lower than the price of failure. Choose compliant breakers - every time. Onesto KCM1, KCMD2, and KCM5 breakers ensure the highest compliance standards and are manufactured for various applications.

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Expanded test laboratory provides polymer users with more data

Motion plastics manufacturer igus has expanded its international testing facilities to a total test laboratory footprint of over 5500 m² of dedicated research space to support its growing product portfolio and enable continuous improvement of its product quality.

The newly expanded test laboratory now combines testing for energy chains, highly flexible Chainflex cables, iglidur plain bearings, drylin linear technology, low-cost automation components, and igus:bike applications. New developments are expected to enable a more comprehensive evaluation of product performance before reaching customers.

"We have expanded our test laboratory area to support quicker innovation cycles and more comprehensive real-world testing scenarios," says Ian Hewat of igus South Africa. "This means our customers benefit from even greater

confidence that the components they use will reliably perform in their specific applications under the most demanding conditions. A key feature of the expanded facility is the new 1500 m² test area, which enhances existing dedicated outdoor and indoor test spaces. Customers can now access testing environments that replicate real operating conditions, including outdoor weather exposure, extreme temperatures as low as -40 °C, cleanroom-compatible formulations, and tailored application trials," says Ian.

He mentions that the test laboratory carries out over 15,000 individual tests at more than 742 test stations each year. These include endurance runs, multi-axis stress tests, and application-specific cycles such as long travel simulations for energy chains and dynamic loads for bearings. The large volume of data generated in the expanded facility feeds into igus's online tools, including the service life calculator, product finders, CAD configurators, and predictive maintenance tools. These tools assist engineers and procurement specialists in more accurately selecting the right components for their projects.

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Maximising reliability and safety: the importance of mcc and motor maintenance

By: Minx Avrabos

Motor Control Centres (MCCs) and electric motors are the backbone of many industrial, commercial, and even institutional facilities. For electrical contractors, ensuring these components are properly maintained is not just a client expectation—it is a critical factor in upholding safety, reliability, and operational efficiency. Here's a comprehensive look at why MCC and motor maintenance should be a top priority for every electrical contractor.

1. Enhancing system reliability and reducing unplanned downtime

MCC and motor failures cause unexpected downtime that can halt entire production lines or critical services, leading to lost productivity and revenue.

Preventive maintenance—inspections, cleaning, and testing—detects issues like loose connections, degraded insulation, worn contacts, or vibrations early.

Predictive maintenance through vibration analysis, thermal imaging, and current monitoring uncovers issues before interruptions arise.

By implementing a structured maintenance programme, contractors can assure clients of minimised risk for costly, disruptive failures.

2. Improving electrical safety

MCCs operate at high energy levels, and motors experience significant electrical

and mechanical stresses. Poor upkeep creates hazards like:

- Electrical fires from loose or corroded connections
- Arc flash incidents due to insulation breakdown or faulty breakers
- Mechanical failure leading to injury risks

Routine maintenance ensures:

- Proper torque on terminals and lugs
- Functionality of protective devices (like overload relays and circuit breakers)
- Insulation integrity and grounding continuity

This protects personnel and property and limits legal liability.

3. Extending equipment life and reducing costs

MCCs and motors require major investment. Regular maintenance extends equipment life by:

- Lubricating bearings and moving parts
- Replacing worn components before they fail
- Cleaning to prevent overheating or contamination

A longer equipment life translates into lower capital expenditure on replacements and fewer major repairs, benefiting both contractors and clients

4. Maximising energy efficiency

Motors are among the largest consumers

of electrical energy in most facilities. Neglected maintenance can lead to increased operating costs. For example:

- Dirty or poorly aligned motors draw excess current
- Failing insulation causes leakage and losses
- Obstructed ventilation leads to overheating and reduced efficiency
- Proper maintenance—alignment, cleaning, and timely part replacement—keeps motors running efficiently, reducing waste and supporting sustainability

5. Regulatory compliance and documentation

Electrical systems are subject to standards and regulations (e.g., NFPA 70B, OSHA, local codes).

Contractors must:

- Maintain accurate records of inspections and corrective actions
- Ensure systems comply with safety and operational standards
- Well-documented maintenance helps during

audits and meets insurance requirements.

6. Protecting contractor reputation and client trust

Proactive MCC and motor maintenance show a contractor's commitment to quality, safety, and satisfaction. It demonstrates competence and builds lasting relationships through:

- Reduced emergency callouts
- Predictable maintenance schedules
- Fewer disputes over equipment performance or failures

Conclusion

Regular, thorough maintenance of MCCs and motors is a cornerstone of electrical contracting best practices. It safeguards people, property, and productivity, while supporting compliance and cost-efficiency. By prioritising maintenance, electrical contractors not only meet their professional obligations but also create tangible value for their clients—and for their own business reputation.



Understanding the different types of motor control centres

Motor Control Centres (MCCs) are essential components in industrial and commercial electrical systems, providing centralised control for motors and associated equipment. MCCs house motor starters, circuit breakers, fuses, and other control devices in a single enclosure, making maintenance and monitoring more efficient. There are several types of MCCs, each designed for specific applications and operational environments.

1. Conventional Motor Control Centres

Conventional MCCs, also known as fixed-type MCCs, feature individually mounted starters and control devices. Components are hardwired, making modifications or expansions more time-consuming. These centres are suitable for applications where changes are infrequent and reliability is paramount.

2. Draw-Out Motor Control Centres

Draw-out or plug-in MCCs allow individual units to be inserted or withdrawn without disconnecting power to the entire centre. This design offers enhanced safety and ease of maintenance, as faulty units can be serviced

or replaced without major downtime. Draw-out MCCs are preferred in industries where operational continuity is crucial.

3. Intelligent Motor Control Centres

Intelligent MCCs (iMCCs) use digital communication, monitoring, and control tools. They include smart devices such as PLCs, networked relays, and meters for real-time diagnostics and remote control. iMCCs suit modern sites aiming for greater efficiency, predictive maintenance, and integrated automation.

4. Low-Voltage vs Medium-Voltage MCCs

MCCs are also classified by voltage rating. Low-voltage MCCs (up to 600V) are common in standard industrial applications, while medium-voltage MCCs (above 600V) are used for large motors and heavy-duty equipment in industries like mining and utilities.

In summary, choosing the right type of Motor Control Centre depends on factors such as flexibility needs, maintenance requirements, safety, and integration capabilities. Proper selection ensures operational efficiency and system reliability.

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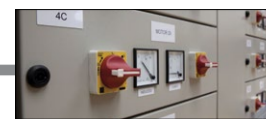
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Motor Control Centres (MCCs) and Motor Protection: essential knowledge for electrical contractors

By: Minx Avrabos

Motor Control Centres (MCCs) are essential for the efficient and safe operation of industrial and commercial electrical systems, especially in controlling and protecting motors. For electrical contractors dealing with low- to mid-voltage systems (typically up to 600V), understanding the design, function, and protection features of MCCs is vital for ensuring reliability, safety, and compliance with relevant codes and standards.

What are motor control centres (MCCs)?

An MCC is a collection of one or more enclosed sections sharing a common power bus, mainly housing motor control units. These units typically include motor starters, circuit breakers, fuses, contactors, overload relays, and sometimes variable-frequency drives (VFDs) or soft starters. MCCs are extensively utilised in manufacturing, water treatment, HVAC, and other industries where multiple motors are operated.

Key Components of MCCs

- **Incoming power section:** Receives and distributes power within the MCC.
- **Vertical bus:** Delivers electricity up and down to all parts of the MCC.
- **Motor starter units:** A combination of a contactor, an overload relay, and a disconnect device for each motor.
- **Control devices:** Buttons, warning lights, and switches used by operators to control the motors.
- **Protection devices:** Parts like fuses or breakers that cut off electricity if there is a problem to prevent damage or danger.
- **Communication modules:** Devices that let operators check on the MCC from a distance or connect it to building automation systems.

Why MCCs matter for electrical contractors

MCCs provide a centralised, organised, and safe means to control and protect multiple motors. They simplify maintenance, troubleshooting, and future expansion. For contractors, correctly installing and commissioning MCCs is essential to system reliability and compliance with safety regulations, such as the National Electrical Code (NEC) and IEC standards.

Motor protection: The fundamentals

Motors are valuable and vulnerable assets. Their failure can halt production, damage equipment, and create safety hazards. Key threats include overcurrent, overload, phase loss, phase reversal, voltage imbalance, and ground faults. MCCs address these risks through integrated protection features.

Overcurrent protection

Overcurrent occurs when the current exceeds the motor circuit's rated capacity. This may be due to a short circuit or a ground fault. MCCs typically

use circuit breakers or fuses to rapidly disconnect the faulty circuit, protecting equipment and personnel.

- **Circuit breakers:** Devices, either mechanical or electronic, that can be set to shut off power when current exceeds a specified threshold.
- **Fuses:** Parts that quickly stop the flow of electricity in case of a short circuit to protect wires and equipment.

Overload protection

Overloads occur when a motor draws more current than its rated full-load current for an extended period, often due to mechanical issues such as jammed bearings or excessive loads. Overload relays, usually thermal or electronic, sense this condition and disconnect the motor before it overheats.

- **Thermal overload relays:** Devices that use a strip of metal, which bends when it gets hot from too much current, to shut off the motor before it gets damaged.
- **Electronic overload relays:** Provide more precise protection and can monitor additional parameters, such as phase loss or imbalance.

Phase loss and phase imbalance protection

Three-phase motors are sensitive to phase loss (one phase open) or phase imbalance (unequal voltages across phases). These conditions cause overheating and can rapidly damage motors. Modern MCCs often include phase-monitoring relays that detect these anomalies and shut down affected motors.

Ground fault protection

Ground faults occur when current unintentionally flows to ground, posing shock and fire hazards. MCCs may include ground-fault relays or circuit breakers with built-in ground-fault detection, especially in sensitive or critical applications.

Additional protection features

- **Undervoltage release:** Shuts off the motor switch if power drops too much, stopping damage or unsafe restarts.
- **Short-circuit protection:** Quick-acting parts prevent major electrical faults from causing serious damage.
- **Motor management relays:** Advanced relays that track things like temperature, vibration, and hours of use, so maintenance can be planned before problems happen.

Best practices for MCC installation and Motor Protection

- **Accurate sizing:** Select protection devices (breakers, fuses, relays) based on motor ratings and application requirements.
- **Proper coordination:** Ensure that upstream and downstream protective devices operate in the correct sequence to localise faults and prevent unnecessary shutdowns.
- **Compliance with standards:** Adhere to NEC, IEC, and local codes for



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clearances, grounding, labelling, and arc flash protection.

- **Routine testing and maintenance:** Periodic inspection and functional testing of MCC components are vital for continued reliability.
- **Documentation:** Maintain up-to-date as-built drawings, operating manuals, and protection setting records.

Emerging trends: Intelligent MCCs

MCCs are changing as new digital tools are used. Intelligent MCCs (iMCCs) use networks such as Ethernet/IP, Profibus, and Modbus for monitoring and control. These offer benefits for contractors and end-users, such as:

- **Remote monitoring:** Real-time status and diagnostics reduce downtime and maintenance costs.
- **Predictive maintenance:** Condition monitoring helps schedule service before failures occur.
- **Improved safety:** Advanced protection functions and data logging enhance system safety and troubleshooting.

Common mistakes to avoid

- **Underestimating short-circuit ratings:** Confirm the MCC's short-circuit withstand rating aligns with the available fault current.

- **Improper grounding:** Inadequate grounding can pose safety hazards and lead to unreliable protection.
- **Ignoring environmental conditions:** MCCs in challenging environments may require specialised cabinets and additional protection from dust, water, or chemicals.
- **Failing to update Settings:** As processes change, protection settings may need to be adjusted to remain effective.

Conclusion

For electrical contractors working with low- to mid-voltage systems, a strong understanding of MCC design and motor protection strategies is crucial. MCCs not only simplify the control and protection of multiple motors but also improve safety, reliability, and ease of maintenance. Adhere to best practices and stay updated with technological advancements to consistently provide robust solutions that safeguard motors and the facilities they serve—take proactive steps today to uphold the highest standards in every project.

Now is the time to focus on understanding MCCs and implementing effective motor protection. Go beyond merely meeting code—take the lead in safeguarding investments, maximising uptime, and building a reputation for quality and reliability in every project you undertake.

Variable frequency drives: an essential tool

Variable Frequency Drives (VFDs) are vital in modern electrical work, providing distinct advantages for contractors and users. Knowing how to operate VFDs effectively distinguishes you in an energy-aware market.

What is a VFD?

A VFD is an electronic device that controls the speed and torque of electric motors by adjusting the frequency and voltage of the power supply. This ability allows for precise control of motor-driven equipment, such as pumps, fans, conveyors, and compressors.

Why should electrical contractors use VFDs?

Energy Efficiency: VFDs optimise motor speed to match load requirements, leading to significant energy savings. In HVAC, water treatment, and industrial processes, this can substantially reduce operating costs for your clients.

Extended equipment life: By providing soft starts and stops, VFDs reduce mechanical and electrical stress on motors and connected machinery, minimise maintenance needs and extend equipment longevity.

Enhanced process Control: VFDs allow smooth speed adjustments, increasing system design flexibility and improving process results.

Regulatory compliance: Many codes and standards now demand variable speed controls.

Understanding VFDs assists you in meeting these requirements.

Installation considerations

When specifying or installing VFDs, ensure correct sizing, motor compatibility, and harmonic mitigation. Verify proper grounding and shielding to minimise electromagnetic interference (EMI). It's also crucial to educate clients on VFD maintenance and programming to achieve optimal performance.

Conclusion

Using VFDs adds value for customers and demonstrates your commitment to energy efficiency. Staying updated with VFDs keeps you competitive and guarantees optimal results.



A VFD is an electronic device that controls the speed and torque of electric motors by adjusting the frequency and voltage of the power supply.

Motor Protection Circuit Breakers (MPCBs): the contractor's choice for reliable motor safety

By: Minx Avrabos

For electrical contractors, reliable motor protection is essential—not just for safeguarding equipment, but for ensuring the smooth operation of the entire facility. Motor Protection Circuit Breakers (MPCBs) have become the go-to solution for modern motor safety, offering a range of advantages over traditional protection methods.

What is an MPCB?

An MPCB is a specialised circuit breaker designed specifically for motor circuits. Unlike standard circuit breakers or thermal overload relays, MPCBs are engineered to provide comprehensive protection against overloads, short circuits, and phase failures, all in a single, compact device.

Key benefits for contractors

- **Comprehensive Protection:** MPCBs protect motors from overload, short circuit, phase loss, and unbalanced phases. This reduces the risk of motor burnout and costly downtime.
- **Space-saving design:** With overload and short-circuit protection combined into one unit, MPCBs save valuable panel space and simplify wiring.
- **Fast Troubleshooting:** Clear visual trip

indicators and easy reset mechanisms mean less time spent diagnosing and fixing issues.

- **Adjustable Settings:** Many MPCBs feature adjustable current settings, allowing contractors to fine-tune protection for different motor sizes and applications.
- **Increased Safety:** MPCBs can be used as manual isolators, providing safe disconnection during maintenance or emergencies.

Why switch from traditional protection?

While fuses and thermal overload relays have been industry staples for decades, they often require multiple components and can lead to nuisance tripping or slow fault response. MPCBs streamline the process, reduce errors, and improve reliability.

Installation tips for contractors

- Select an MPCB with the right current range for the motor.
- Ensure proper coordination with downstream devices for selective tripping.
- Regularly inspect and test MPCBs during maintenance routines.



Conclusion

For electrical contractors aiming to deliver efficient, reliable, and safe motor installations, MPCBs are an indispensable

tool. By embracing MPCBs, contractors can provide their clients with better protection, easier maintenance, and greater peace of mind.

Intelligent MCCs (iMCCs): a game changer

Electrical contractors are seeking ways to improve efficiency, reliability, and safety. Intelligent Motor Control Centres (iMCCs) offer advanced intelligence and connectivity for motor control.

What are iMCCs?

Intelligent MCCs integrate smart devices—such as intelligent overload relays, power meters, and variable frequency drives—alongside robust industrial communications networks (e.g., Ethernet/IP, Modbus). These components are linked by centralised or distributed control logic, often programmable via PLCs or DCS systems. Unlike conventional MCCs, iMCCs can monitor, control, and diagnose motor operations in real time, providing actionable data to operators and maintenance teams.

This data can include motor current, voltage, temperature, energy consumption, and even predictive alerts for potential failures.

Key advantages for contractors

Streamlined Installation: iMCCs often come with pre-wired, modular components that reduce installation time and minimise wiring errors. Modularity allows contractors to easily scale systems and adapt to changing load requirements on site. Factory-tested configurations further reduce commissioning time and the likelihood of unexpected issues during startup.

Enhanced Troubleshooting: Built-in diagnostics quickly pinpoint issues, reducing downtime and maintenance costs. Faults are logged with precise time stamps and can be accessed remotely, enabling contractors to troubleshoot and resolve problems without being physically present at the panel. This reduces the need for costly emergency callouts and improves service response times.

Improved Safety: Remote access and



advanced protection features let users monitor and intervene more safely, reducing the need for physical interaction with live components. iMCCs support arc-flash mitigation strategies and lockout/tagout procedures, and can automatically isolate faulty circuits. Enhanced alarming and data logging also improve compliance with workplace safety standards.

Energy Efficiency: Real-time data enables contractors and facility managers to optimise energy use and extend equipment lifespans. Advanced analytics and power monitoring enable the identification of inefficient motors or loads, scheduling preventive maintenance, and reducing peak demand charges. This leads to both

operational and cost efficiencies over the lifetime of the installation.

Why Embrace iMCCs?

For electrical contractors, adopting iMCCs means delivering smarter, future-ready solutions to clients. Seamless integration with plant-wide automation systems enables centralised monitoring and control, supports

predictive maintenance strategies, and enhances overall plant productivity. The ability to generate detailed reports, analyse historical trends, and implement remote updates ensures that facilities remain agile and resilient in the face of changing demands.

In summary, iMCCs empower contractors to deliver smarter, safer, and more efficient motor control solutions.

Electrical earth connections through cable glands

Firstly, there is no need to earth a plastic cable gland (as it is not conductive), and it is generally not necessary to earth cable glands used to terminate multi-core unarmoured cables, although installers may choose to do so as part of good practice.

The requirements for earth connections in cable glands are defined in the general standards for cable glands, e.g., SANS 1213 and IEC 62444.

Why earth a cable gland?

In general, cable glands used with armoured cables are earthed for one of the following three reasons: -

1. To prevent induced voltage build-up, possibly leading to sparks.
2. To allow them to carry a fault current to earth in the event of an electrical fault.
3. For EMC protection.

We shall look at each of these in turn, but first, a quick reminder about cable construction.

The majority of armoured cable construction types fall into two types: those that use steel (SWA) or aluminium (AWA) wires laid in a slow helical form around the cable to form an armour, and those that use much thinner but a larger number of wires that are arranged as a braid around the cable bedding. Less common are armoured cables with a metal tape wound around the bedding, but they are important in certain applications, as we shall see in the section on EMC.

It is also worth reviewing how a cable gland is earthed. This can be done by any of four methods.

1. Electrical contact through the armour clamping cone and cone ring, and through the threads of a threaded entry hole in an earthed enclosure when the cable gland is tightened into it.
2. By face-to-face contact with an unpainted (earthed) metal enclosure when the entry holes are clearance holes rather than threaded. Usually, the cable gland is held in place with a locknut and, preferably, a serrated washer to improve electrical contact and prevent slackening due to vibration. Note that this electrical contact is often improved by fitting an earth tag.
3. Using a slip-on earth tag (sometimes known as a 'banjo'). This is fitted between the cable gland and the enclosure and provides a superior electrical contact with the cable gland. Earth tags are typically made from brass or nickel-plated brass and can be bent, if needed, to allow easier access for connecting a dedicated earth cable. This arrangement provides a visual indication of both an earth connection and an electrical one. An earth tag is essential if the enclosure is not made of metal or painted.
4. The final earthing method is by using a high-current earth connection. This would typically be used when the installation involves power cables with armour used as the earth connection and forming what is known as the CPC, or Circuit Protective Conductor. In this type of installation, the armour may have to be capable of passing high currents to operate a trip or breaker in a fault condition. This means that the cable gland and its connection to earth must also carry the same high current, and a standard earth tag is not capable of doing so. Instead, a screw-on earth tag can be used, or, alternatively, the cable gland can have a dedicated earth lug fitted, usually known as an Integrated Earth connection.



Non-Armoured Cable



Semi-Flexible Braid Armoured Cable



Armoured Cable

1. Earthing for the prevention of an induced voltage.

The armour of a cable is designed to protect or shield the cable and normally does not carry any current. Power cables (excluding single-core cables, which will be discussed in the section on when to isolate a cable gland) are usually constructed so that any magnetic fields produced by the alternating currents in the cores are minimised. Of course, in practice, achieving perfectly balanced electrical fields is impossible. This means that in a power cable, a voltage may be induced in the cable armour even if it is not electrically connected to the main current-carrying cores. The induced voltage might be sufficient to cause an electric shock if touched, and if a spark occurs, it can harm sensitive electronic equipment. In a hazardous environment, it could act as the ignition source for an explosion.

Cable glands for use with armoured cables provide an earth clamp connection by means of a cone and cone ring inside them, so that the armour is electrically connected to the cable gland. If the cable gland is also connected to earth, then, as a consequence, the cable armour will also be earthed, and a potential difference (a voltage) cannot be generated in the armour.

CCG Cable Gland Armour Clamping Cone and Cone Ring and metal-to-metal thread engagement.

2. Earthing allows the armour to carry a fault current to earth in the event of an electrical fault.

This is applicable when the electrical installation uses the cable armour as a protective earth, and the current that is required to be carried is defined in Table 5 of IEC 62444.

In general, the connection between the cable gland and the cable armour is not the limiting factor in selecting the rating category for a cable gland.

Cable diameter mm	Category A minimum kA rms	Category B minimum kA rms	Category C minimum kA rms
> 4 to 8	-	-	-
> 8 to 11	0,5	3,06	10,0
> 11 to 16	0,5	3,06	13,1
> 16 to 23	0,5	3,06	13,1
> 23 to 31	0,5	4,0	13,1
> 31 to 43	0,5	5,4	13,1
> 43 to 55	1,8	7,2	43,0
> 55 to 65	2,3	10,4	43,0
> 65	2,8	10,4	43,0

If the cable has a braid armour/screen, the associated cable gland cannot have a higher rating than Category A, as the cable's braid will not be capable of carrying the currents required to meet Category B. In other words, the limitation is typically dictated by the cable construction, not the cable gland.

Cable glands for SWA or AWA cables can have a Category B rating as long as the connection between the cable gland and earth is sufficiently good. This can be achieved by either securing the cable gland to a threaded entry on the (earthed) equipment or using an earth tag. Since cable glands can be fitted to clearance holes and secured with a locknut, their electrical rating must default to the lowest value. Therefore, they are often specified as Category A if no earth tag is used and as Category B if an earth tag is fitted.

A Category C rating is only achievable with a heavy-duty earth connection cable and a very low resistance path to earth. This can be attained using screw-on earth tags or cable glands with an integrated earth stud.

In all these installations, it is vital that the cone and cone ring armour clamp are of good design and quality. Independent tests have shown that glands with loose cones and plastic-to-metal threads cannot carry an earth fault current.

Earthing for EMC protection.

EMC, or electromagnetic compatibility, is the ability of equipment, cables, or



Screw-On Earth Tag



Earth Tag

systems to operate satisfactorily within their electromagnetic environment without causing unacceptable electromagnetic disturbances to other equipment in the same environment.

With the increased use of variable speed drives (VSD), instrumentation and control, wireless data acquisition, and communication in industries, reliance on EMC cables and enclosures to maintain signal and power integrity has become increasingly important.

Although cable glands do not emit

CONTINUED ON PAGE 10



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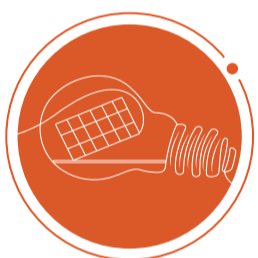
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Cable theft in South Africa: causes, impact, and solutions



Cable theft disrupts essential services, undermining South Africa's infrastructure, economy, and daily life. This article explores its root causes, extensive impacts, and possible solutions.

The scale and causes of cable theft

Cable theft mainly targets copper cables used for electricity supply, telecommunications, and railway signalling. The high global demand for copper and rising black-market prices make these cables attractive for criminal gangs and opportunistic thieves. South Africa's widespread unemployment, poverty, and limited law enforcement resources further worsen the issue, creating an environment where such crimes are both tempting and profitable.

Organised crime groups are frequently involved, employing sophisticated methods to extract and transport stolen cables. The presence of unscrupulous scrap dealers, who purchase stolen copper with minimal scrutiny, sustains this cycle. Efforts to regulate the scrap metal industry have achieved limited success due to corruption and enforcement loopholes.

The impact of cable theft

The consequences of cable theft are severe and multi-layered:

- **Power outages:** Theft of electricity cables causes frequent blackouts, impacting homes, businesses, hospitals, and schools. These outages disrupt economic activity and jeopardise essential services.
- **Transport disruption:** The railway sector, especially PRASA and Transnet, faces theft of signalling and power cables. This causes trains to be delayed or cancelled, affecting commuters and freight logistics.
- **Telecommunications disruption:** Stolen telecom cables lead to connectivity outages, impacting both urban and rural areas and hindering emergency response efforts.
- **Economic Costs:** The financial burden is enormous, with billions of rands spent yearly on repairs, replacements, and security measures. The indirect costs, such as lost productivity and investor confidence, further weaken the economy.

Possible solutions

Addressing cable theft in South Africa requires a multi-pronged approach:

1. Strengthening law enforcement

- Establish specialised police units dedicated to investigating and preventing cable theft.
- Increase patrols and surveillance in hotspot areas, using technology such as drones and CCTV.
- Impose harsher penalties for offenders and ensure swift prosecution.

2. Regulating the scrap metal industry

- Enforce strict licensing and record-keeping for scrap metal dealers.
- Mandate proof of origin for all copper sales to deter the trade in stolen goods.
- Conduct regular audits and impose heavy fines for non-compliance.

3. Community engagement and awareness

Launch educational campaigns to highlight the societal impact of cable theft.

- Encourage communities to report suspicious activities.
- Offer rewards or incentives for information leading to arrests.

4. Technological innovations

- Replace copper cables with less valuable alternatives, such as aluminium or fibre optic cables, where feasible.
- Implement cable-marking and tracking systems to trace stolen materials.
- Use tamper-proof infrastructure and smart sensors to detect theft attempts in real time.

5. Addressing socio-economic factors

- Create job opportunities and skills development programs in high-risk areas to reduce the incentive for cable theft.
- Support community upliftment initiatives that provide alternatives to criminal activity.

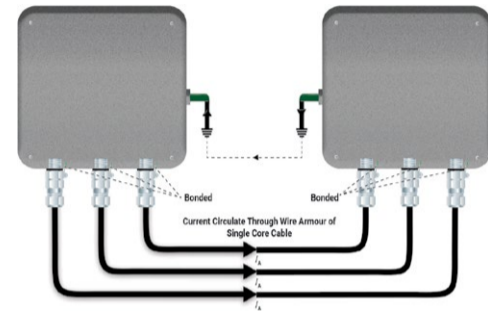
Conclusion

Cable theft hampers South Africa's progress and security. Consistent, coordinated efforts among government, law enforcement, industry, and communities are vital to safeguard infrastructure and ensure a safer future.

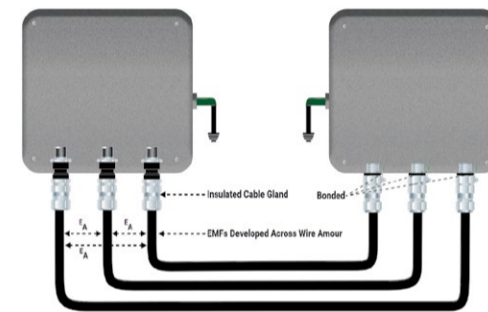
Electrical earth connections through cable glands



CCG Integral Earth Gland



Cable Glands bonded at both ends



Cable Glands bonded at one end

electromagnetic interference (EMI), they are connected to cables that could form part of an installation that could emit or be susceptible to electromagnetic interference.

It is essential that the connection between the cable gland and the cable screen maintains the cable's screening protection. This is achieved by ensuring a proper connection to earth and preventing gaps in the screening provided by the gland itself. Independent tests according to EN 55011 and EN 55022 EMC standards for class B radiation emissions demonstrate the typical difference in electromagnetic emissions from a cable when the screen is connected to earth versus when it is not. (The red line is regarded as the 'pass' mark.)

The graph above shows the result when the cable screen is NOT connected to earth within the cable gland, allowing the cable to act as an aerial and transmit radiation. Note that at most frequencies, the electromagnetic radiation level exceeds acceptable limits.

The second graph shows the same installation, but this time the cable screen is correctly connected to earth through the cable gland. Note that at all tested frequencies, the electromagnetic radiation level is well below acceptable limits. This clearly demonstrates the importance of correctly earthing the cable armour or screen within the cable gland.

When to isolate a cable gland

Whilst the correct connection of a cable gland (and hence the cable armour) to earth is important, there is one common installation that requires a gland to be isolated from earth: when it carries a single-core power cable as part of a multi-phase installation. Eddy currents are created in the armour of energised single-core power cables and become significant if the cable is carrying a high current (typically > 200A). If more than one phase of an electrical power system is connected to a metal enclosure (or a metal gland plate) and each phase is supplied through a single-core cable, then eddy currents will flow through the armour of the cables, the cable glands and the enclosure or gland plate. These induced currents can be large enough to generate significant heat, potentially melting the cable in extreme cases. The solution is to earth the cable glands/cable armour at one end of the cable and to isolate them at the other end. This can be achieved with a dedicated insulated gland or a standard gland in conjunction with an insulated adaptor. This will retain the electrical integrity of the installation and prevent the dangerous circulation of eddy currents with the associated heat generation.

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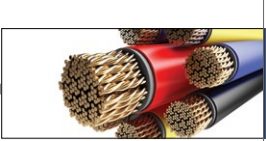
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Why cable accessories matter to electrical contractors

The success of an electrical installation relies on much more than just the cables—cable accessories such as joints, terminations, glands, lugs, and cleats are critical to system safety, performance, and longevity. For electrical contractors, choosing the right accessories is just as vital as selecting the proper cables for the job.

Ensuring safety and compliance

Electrical installations must adhere to strict safety standards and regulations. Cable accessories are engineered not only to protect cables from physical damage and environmental hazards but also to guarantee secure electrical connections. High-quality accessories help prevent issues such as insulation failure, moisture ingress, and accidental disconnections, reducing the risk of electrical fires, equipment failure, and safety hazards to personnel.

Enhancing system performance

The performance of any electrical system is only as strong as its weakest link. Poorly chosen or poorly installed accessories can cause voltage drops, overheating, and signal interference. On the other hand, appropriate cable glands, terminations, and connectors ensure optimal conductivity, mechanical strength, and environmental sealing. This results in systems that operate efficiently, reliably, and with minimal downtime—a critical factor for contractors working on commercial or industrial projects where power continuity is paramount.

Facilitating installation and maintenance

Well-designed cable accessories simplify installation, saving contractors time and reducing labour costs. Accessories such as pre-insulated lugs or easy-to-fit glands streamline the process, minimise the risk of installation errors, and make future maintenance straightforward. This efficiency allows contractors to deliver projects on schedule and within budget, enhancing their reputation and client satisfaction.

Protecting investments

Electrical systems represent significant investments for clients. Using quality cable accessories helps protect that investment by extending the life of cables and associated equipment. Proper accessories reduce the likelihood of costly repairs or system failures, ultimately saving time and money for both contractors and their clients.

Beyond these fundamental benefits, cable accessories also serve as a key driver of innovation within the electrical industry. Modern projects frequently require specialised solutions, such as fire-resistant terminations, cable management systems designed for confined spaces, or environmentally sealed glands for demanding outdoor environments. Manufacturers continually develop advanced accessories to meet these changing needs, allowing electrical contractors to undertake a wider variety of projects and provide customised solutions to clients.

Furthermore, using high-quality cable accessories can help meet sustainability objectives. Accessories that reduce

energy loss, prevent environmental damage, or are made from recyclable materials support greener installations and promote environmental responsibility. For contractors aiming to comply with green building standards or achieve client sustainability goals, the right accessories can have a significant impact.

Training and keeping up to date with the latest cable accessory technologies is also crucial for contractors. Industry standards

and product offerings are continuously changing. By staying informed, contractors can ensure they specify and install products that reflect the newest in safety, efficiency, and performance, providing greater value to their clients.

In summary, cable accessories are more than just additional parts—they are vital elements that ensure the safety, reliability, and long-term success of every electrical installation. For electrical contractors

” Poorly chosen or poorly installed accessories can cause voltage drops, overheating, and signal interference.

striving for excellence, attention to these details genuinely matters.

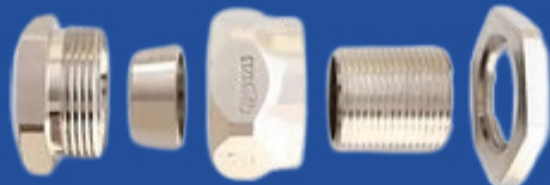
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Energy resilience takes centre stage in 2026

In 2026, one theme dominates conversations across the built environment, infrastructure planning, and commercial development sectors: energy resilience.

For South Africa, this is not a trend; it is a necessity.

Years of grid instability, load-shedding, rising electricity costs, and increasing pressure on infrastructure have fundamentally transformed how buildings are designed, specified, and managed. Energy resilience is no longer an optional extra. It is now a fundamental requirement.

And at the heart of this transformation sits the lighting industry.

The Shift in expectations for lighting professionals. With this shift comes greater responsibility.

Lighting professionals in 2026 are expected to:

- Understand backup power integration
- Design systems compatible with renewable energy sources
- Specify products that maximise efficiency and longevity
- Advise clients on the total cost of ownership
- Ensure compliance with evolving safety and efficiency standards

Clients are no longer asking, "What fitting should we use?"

They are asking, "How will this building

function when the power goes out?"

That question changes everything.

Lighting designers, engineers, consultants, and suppliers must now integrate technical excellence with energy strategy insight.

Smart, Sustainable, and Resilient Design

Resilience is not just about surviving outages. It involves designing systems that are:

- Energy intelligent
- Digitally integrated
- Scalable for future upgrades
- Sustainable in the long term

Smart lighting controls, daylight harvesting, occupancy sensors, and remote monitoring are becoming standard expectations.

Emergency lighting must not only meet regulations but also perform reliably in real-world conditions.

In short, resilience is redefining what "good lighting design" means.

IESSA's Role in supporting the industry

As the premier lighting society in South Africa, the Illuminating Engineering Society of South Africa (IESSA) acknowledges that the demands on lighting professionals are changing swiftly.

Our role is to:

- Mentor and guide professionals across



- all career stages
- Provide access to industry-relevant training and technical knowledge
- Facilitate conversations around best practice and innovation
- Support compliance and standards awareness
- Foster collaboration across the lighting ecosystem

Energy resilience is not a challenge any professional can tackle alone. It demands shared expertise, ongoing learning, and industry-wide cooperation.

Through our programmes, conferences, and CPD opportunities, IESSA remains dedicated to supporting lighting professionals in staying ahead of regulatory updates, technological developments, and market needs.

Moving forward in 2026

As we move further into 2026, energy resilience will continue to shape how buildings are powered, designed, and experienced. For lighting professionals, this presents both a challenge and an opportunity.

Those who embrace innovation, expand their technical capabilities, and align with industry best practices will not only stay relevant, but they will also lead.

IESSA represents South Africa at an international level and acts as the National Committee of the CIE (Commission Internationale de l'Eclairage). South African experts in various fields of lighting technology serve on CIE international committees responsible for developing standards related to different aspects of illumination.

Membership of IESSA is available to both individuals and organisations involved in the lighting industry of South Africa. To join IESSA, you must be a Lighting Professional. Group membership is open to any educational, scientific, technical, professional, institutional, public, commercial, municipal, or parastatal entity actively engaged in the lighting sector.

If you would like to learn more about IESSA and the benefits of becoming a member, please email us at info@iessa.org.za

As we move further into 2026, energy resilience will continue to shape how buildings are powered, designed, and experienced. For lighting professionals, this presents both a challenge and an opportunity.

Lighting controls and automation: the bright future

Demand for intelligent, energy-efficient lighting is rising across construction and building management. For electrical contractors, expertise in lighting controls and automation is now vital.

Mastering these technologies creates new business opportunities, increases project value, and aligns your services with the future of smart buildings.

The basics of lighting controls

Lighting controls are devices and systems that manage lighting in a space. At their simplest, they include manual switches and occupancy sensors; at their most advanced, they consist of networked systems that connect with building automation platforms. Modern lighting controls enable precise adjustment of lighting levels, scheduling, and even colour temperature—leading to optimised energy use, enhanced occupant comfort, and longer fixture lifespan.

Types of lighting control systems

- **1. Standalone Controls:** These are basic systems, such as dimmers, timers, and occupancy/vacancy sensors. They are easy to install and ideal for retrofits or isolated rooms.
- **2. Room-based Controls:** These systems manage lighting in a single room or zone, often using wireless technology

for flexibility. They are commonly found in commercial offices and classrooms.

3. Networked Lighting Controls (NLCs):

These advanced systems connect multiple devices over a wired or wireless network, offering centralised control and monitoring. NLCs can be integrated with HVAC, security, and other building systems, enabling comprehensive automation and data analytics.

Benefits for contractors and clients

- **Energy Savings:** Lighting controls can reduce energy usage by 30-60% compared to manual switching, especially when combined with LED technology. This translates to lower utility bills and an improved sustainability profile for clients.
- **Code Compliance:** Many regions require lighting controls to comply with energy codes such as ASHRAE 90.1 and Title 24. Contractors familiar with these requirements can ensure projects remain compliant, avoiding costly rework.
- **Enhanced User Experience:** Automated controls provide occupants with optimal lighting for different tasks and times of day, increasing comfort and productivity.
- **Maintenance and Monitoring:** Advanced systems offer remote monitoring and diagnostics, enabling contractors to deliver ongoing service contracts and



Modern lighting controls enable precise adjustment of lighting levels, scheduling, and even colour temperature—leading to optimised energy use, enhanced occupant comfort, and longer fixture lifespan.

predictive maintenance, generating recurring revenue.

Emerging technologies and trends

The integration of IoT (Internet of Things) is revolutionising lighting controls. Wireless protocols such as Zigbee, Bluetooth Mesh, and Wi-Fi make installation and scaling easier. Cloud-based platforms allow remote access and provide advanced analytics, while voice and mobile app controls increase convenience for users. Human-centric lighting, which adjusts colour temperature and brightness throughout the day, is becoming popular due to its health and wellness benefits.

What contractors should know

Electrical contractors should invest in

training and certification programmes offered by lighting manufacturers and industry organisations. Staying up to date on coding standards, system interoperability, and cybersecurity best practices is crucial. Partnering with experienced lighting designers can also help deliver optimal results.

Conclusion

Lighting controls and automation are a key growth sector in the electrical industry. Contractors who adopt these technologies position themselves as innovative professionals prepared to meet the demands of modern buildings. By providing expertise in lighting automation, you not only enhance your project's value but also support energy efficiency and occupant well-being.



The essential role of electrical contractors in lighting design and planning

Lighting design and planning are critical components of any construction or renovation project, shaping a space's functionality, aesthetics, and energy efficiency. While architects and lighting designers often craft the initial vision, electrical contractors play a pivotal role in bringing these designs to life. Their expertise ensures that lighting systems are not only visually appealing but also safe, cost-effective, and compliant with regulations.

Troubleshooting and problem solving
Unexpected challenges can arise during construction, such as unforeseen site conditions or last-minute design changes. Electrical contractors draw on their experience to swiftly troubleshoot issues, adapt plans, and suggest practical alternatives. Their proactive approach minimises delays and ensures the integrity of both design and safety.

Ongoing maintenance and upgrades
The contractors' role often extends beyond installation. They may provide maintenance services, conduct periodic inspections, and offer upgrades as lighting technology evolves. Their continued involvement ensures that systems remain efficient, safe, and up to date with the latest innovations.

Conclusion
Electrical contractors are indispensable partners in lighting design and planning. Their involvement ensures that lighting systems are not only beautiful and functional but also safe, code-compliant, and energy-efficient. By working collaboratively with designers, architects, and clients, electrical contractors help create illuminated spaces that enhance comfort, productivity, and sustainability.

” Electrical contractors draw on their experience to swiftly troubleshoot issues, adapt plans, and suggest practical alternatives.

Translating vision into reality
Electrical contractors act as the bridge between conceptual lighting designs and practical implementation. Once a lighting plan is proposed, contractors evaluate its feasibility within the constraints of the building's infrastructure. They assess factors such as electrical load capacity, wiring routes, and compatibility with existing systems. By collaborating closely with designers and architects, electrical contractors help refine plans to meet both creative and technical requirements.

Technical expertise and code compliance
A primary responsibility of electrical contractors is to ensure that all lighting installations comply with national and local electrical codes. This includes adherence to safety standards, fire regulations, and energy codes such as ASHRAE or Title 24. Contractors are well-versed in the latest technologies and methods, enabling them to recommend appropriate materials and installation techniques. Their knowledge helps prevent costly errors and reduces the risk of future electrical issues.

Optimising energy efficiency
Today's lighting design often emphasises energy efficiency to reduce operational costs and environmental impact. Electrical contractors contribute significantly by selecting and installing energy-efficient fixtures, such as LED lighting, and by integrating intelligent control systems, such as occupancy sensors and daylight harvesting. Their input during planning ensures that the lighting system delivers optimal illumination while minimising energy consumption. Moreover, contractors may advise on utility rebates or incentives available for sustainable lighting solutions.

Project management and coordination
Effective lighting projects require meticulous coordination among various trades. Electrical contractors manage the installation timeline, procure necessary materials, and supervise skilled labour. They coordinate with other contractors to avoid conflicts with HVAC, plumbing, or structural elements. Their project management skills help keep lighting installations on schedule and within budget.



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The latest developments in lighting: what electrical contractors need to know

By Minx Avrabos

In the rapidly changing world of electrical contracting, keeping up with the latest lighting technology is crucial to maintaining a competitive edge and providing high-value solutions to clients. Recent developments are not only transforming how spaces are lit but also creating new opportunities for efficiency, integration, and sustainability. Here's a comprehensive overview of the most important trends and innovations that every electrical contractor should be aware of.

LED technology: The ongoing revolution

LEDs (Light Emitting Diodes) have dominated the lighting industry for over a decade, but ongoing advancements continue to make them even more versatile and efficient. The latest generation of LEDs boasts improved colour rendering, higher lumen output per watt, and extended lifespans. Tunable white LEDs—capable of adjusting colour temperature to mimic natural light throughout the day—are now widely available, making them ideal for offices, schools, and healthcare facilities where circadian-friendly lighting is a priority.

For contractors, the ongoing decrease in LED prices, along with improved efficiency, results in more clients retrofitting existing fixtures. Additionally, new form factors and flexible strip lighting allow for creative

installations in both commercial and residential environments.

Smart lighting and IoT integration

Smart lighting systems are changing how lighting is controlled, monitored, and maintained. These systems, often part of larger Internet of Things (IoT) networks, can be programmed, automated, and remotely controlled via mobile apps or centralised dashboards. Features such as occupancy sensing, daylight harvesting, and scheduling optimise energy savings and user comfort.

Smart lighting offers an opportunity to provide value-added services. Setting up wireless lighting controls, integrating lighting with building management systems (BMS), and configuring sensors for adaptive lighting scenarios are increasingly sought after. Familiarity with protocols like Zigbee, Z-Wave, and Bluetooth Mesh has become essential.

Human-Centric Lighting (HCL)

Human-centric lighting is designed to support health, well-being, and productivity by mimicking the natural changes in daylight. The latest HCL systems use tunable LED fixtures programmed to shift colour temperature and intensity throughout the day. These systems are particularly sought after in hospitals, schools, and workplaces.

Contractors should be prepared to advise clients on HCL and install control systems that can be programmed for circadian lighting schedules. Understanding the science behind HCL can also help contractors educate clients about the advantages of investing in these systems.

UV-C Lighting for disinfection

The COVID-19 pandemic sped up the adoption of UV-C (ultraviolet-C) lighting for disinfecting air and surfaces. The newest UV-C fixtures include integrated safety features and can be installed in HVAC systems or used as standalone units in high-traffic areas. Although not suitable for all environments, UV-C lighting provides a new revenue stream for contractors, especially in healthcare, hospitality, and public transportation sectors.

It's vital for contractors to understand the safety protocols and legal requirements related to UV-C installations. Adequate training and compliance with manufacturer instructions are crucial to ensure safe and effective operation.

Wireless and PoE lighting solutions

The move to wireless lighting control and Power over Ethernet (PoE) lighting is making installation and maintenance easier. PoE lighting systems use Ethernet cables to supply both power and data to LED

fixtures, enabling flexible setups and simple integration with other building systems.

This involves lowering reliance on traditional electrical wiring and enhancing skills in IT infrastructure. Collaborating with IT professionals and developing expertise in network-based lighting solutions will become increasingly important.

Sustainability and circular economy initiatives

Clients are demanding greener, more sustainable lighting solutions. Manufacturers now offer luminaires made from recycled materials, modular designs for easy repair and upgrade, and take-back programmes for end-of-life fixtures. Energy codes are becoming stricter, requiring contractors to stay informed about compliance and rebate programmes.

Advising clients on sustainable options, facilitating the recycling of old fixtures, and ensuring installations comply with the latest energy standards are all part of the modern contractor's role.

Staying ahead of the curve

The lighting sector constantly evolves. For electrical contractors, keeping up with the latest trends—such as advanced LEDs and smart controls, alongside human-centric and sustainable solutions—means providing smarter, safer, and more energy-efficient lighting projects. By remaining informed and adaptable, contractors can ensure their services stay essential in a fast-changing market.

Light + Building 2026 highlights the pace of innovation

Light + Building 2026 showcased industry innovation. From 8 to 13 March 2026, 1,927 exhibitors from 49 countries in Frankfurt displayed solutions advancing electrification, digital connectivity, and lighting design for buildings and urban spaces. Notable technologies included artificial intelligence, bidirectional charging, multifunctional interfaces, and connected lighting, marking the next phase in city and lighting development.

Over six days, 144,767 visitors from 143 countries attended in Frankfurt. The largest international groups came from China, the Netherlands, Italy, Switzerland, France, Austria, Belgium, the UK, Spain, and Greece. Air travel restrictions and geopolitical disruptions in the Middle East, particularly in Dubai, prevented some attendees from attending. Despite this, the event reaffirmed its strong base in Germany and Central and Western Europe and highlighted its international importance for industry, skilled trades, planners, and architects.

"The Light + Building 2026 has once again demonstrated just how innovative and forward-looking this industry continues to be," says Wolfgang Marzin, President and CEO of Messe Frankfurt. At the same time, it highlights the continuing importance of personal encounters and direct exchange, especially in times like these. Light + Building fulfils its role by bringing together people from industry, skilled trades, planning, and design, laying the foundation for dialogue, cooperation, and new ideas. This exchange strengthens industry cohesion and provides vital momentum for its ongoing development. The future lies in electrification.

Light + Building 2026 ended with very high visitor satisfaction. Overall, 95 per cent of

visitors reported being satisfied with their visit and accomplishing their objectives, while the same proportion viewed the range of exhibits positively.

Buildings - from energy consumers to active systems

In the buildings sector, Light + Building 2026 clearly demonstrated how buildings are evolving from passive energy consumers into active parts of an intelligent energy system. Smart energy distribution, integrated load and charging management, and bidirectional charging are increasingly connecting buildings, the grid, and e-mobility, opening new opportunities for energy efficiency and system stability. At the same time, the existing building stock has gained further importance: modular, scalable solutions are making energy modernisation simpler and enabling retrofits to be carried out efficiently and cost-effectively. Digital planning and operational concepts, along with multifunctional interfaces, simplify installation and usage, while secure charging infrastructure and reliable systems for critical applications are becoming more important. In this way, the sector is promoting the next phase in the development of building technology, aiming to make buildings more integrated, flexible, and future-ready.

Lighting - intelligently controlled and atmospherically staged

In the lighting sector, it has become clear that lighting is increasingly developing into a data-driven, adaptive system. Sensors, connected luminaires, and AI-supported control systems enable precise, demand-based light distribution that automatically



The Light + Building 2026 has once again demonstrated just how innovative and forward-looking this industry continues to be.

adjusts to presence, daylight, and specific usage scenarios. Across all application areas - from private homes and hospitality to retail, industry, and urban infrastructure - connected and flexibly scalable solutions take centre stage. Simultaneously, light remains a key design element in interior architecture: high-quality luminaires, diverse design languages, and carefully tuned light colours create atmosphere, guide perception, and enhance the quality of spaces. Sustainable materials, durable components, and circular product design further underline the industry's long-term outlook. Overall, the trend is clearly

towards a new generation of holistic lighting concepts that combine technological precision with emotional impact.

Design, AI and young talent set new trends

The high-quality range of events also spurred the next phase of innovation. The Design Plaza in Hall 3.1 served as the centre for lighting and design topics.

Light + Building

The next Light + Building trade fair will be held from 5 to 10 March 2028 in Frankfurt am Main.



Turning adversity into advantage: how constraints shaped the stadialux floodlight

By: Urbain du Plessis

In the previous article we explored the origins of the StadiLux stadium floodlight, and how a South African design quietly achieved international success in a field dominated by global manufacturers. That story raises a deeper question: how did such an innovation emerge?

The answer lies not in large research budgets or vast engineering teams, but in the opposite conditions. The development of StadiLux shows how constraints—financial, technical and structural—can force engineers to rethink assumptions and pursue solutions that challenge established technology rather than simply improving it.

Innovation is often associated with abundance: advanced tools, large budgets and freedom to experiment. In practice, many enduring engineering advances emerge under pressure. When resources are limited, engineers are forced to focus on fundamentals. The result can be solutions that are not just different, but genuinely better.

When constraints are real, not theoretical

By the late 1980s, stadium lighting technology was dominated by a small number of global manufacturers. Their systems worked reliably, but they were expensive, bulky and inefficient. Development costs ran into hundreds of millions, and innovation tended to follow predictable paths.

South Africa, operating outside these dominant industrial centres, faced a very different reality.

Budgets were limited. Access to advanced tooling was constrained. Local manufacturing capability existed, but it required designs that could be built robustly and repeatedly without specialised processes or complex supply chains. Simply copying or licensing overseas floodlights was neither economically nor strategically attractive.

The challenge was clear: produce a stadium floodlight capable of competing internationally, without the resources normally associated with global R&D programmes.

That constraint prompted a fundamental question: if brute-force lighting was too costly and inefficient, how would a better solution look?

Existing product limitations as design catalysts

Rather than treating existing floodlights as benchmarks to match, the StadiLux design process treated their shortcomings as opportunities.

South Africa's relatively small market created an unexpected advantage. The same engineers who designed the product were also involved in project applications, installation and commissioning. This provided unusually deep insight into the entire lighting system, from manufacturing and supply chain considerations to installation, operation and maintenance.

Three limitations of conventional stadium floodlights proved particularly influential:

- Excessive spill and glare, wasting energy and compromising broadcast quality
- Low optical utilisation, requiring more luminaires and larger structural, civil and electrical infrastructure

- Thermal inefficiency, where heat was managed through size and mass rather than intelligent design

Addressing these problems systemically rather than incrementally would lead to meaningful gains.

The result was a shift in focus - from housing size and lamp power to optical control and geometry. Instead of asking how to make existing designs bigger or brighter,

the question became: how can more of the available light be used effectively?

Constraint-driven optical discipline

One of the most powerful constraints shaping StadiLux was manufacturing precision.

Without the ability to absorb high scrap rates or complex rework, the design had to be inherently efficient. This led to the development of a multi-parabolic reflector

system that relied on geometry rather than sheer size to shape and control light.

By tightly controlling exit angles and concentrating usable output where it mattered most, StadiLux achieved performance improvements that would otherwise have required higher power levels and more luminaires.

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Headcount or outcomes? choosing between TES and BPO

By Willie Du Preez, Managing Director at PPO

South African businesses know labour models well. But the difference between Business Process Outsourcing (BPO) and Temporary Employment Services (TES) is often unclear. Both involve external partners and provide on-site staff, often in factory or warehouse settings.

TES adds flexible headcount. BPO takes ownership of a process and delivers agreed outcomes. The value is in performance, not the number of staff. The key difference: buying extra hands (TES) versus buying results (BPO).

Understanding the practical difference

TES provides labour. The client pays for hours worked, directs staff, and keeps the productivity risk.

BPO delivers outputs, not hours. The BPO partner manages the process, meets targets, and optimises efficiency.

With TES, the client keeps some liability and operational exposure. In BPO, accountability shifts to the partner, who owns the process and results.

Clarifying the real business need

Before choosing, clarify what the business really needs—not just compare rates. Ask if the function can shift to output-based



work and if efficiency can be improved. Also consider whether the operation requires scalability and whether management should supervise staff or hold a partner accountable for results.

Not every function suits output pricing, particularly when performance relies on external factors. However, for well-defined processes, output-based models can link costs to volume and make performance measurable.

Designing for output, not attendance

When output is the main metric, focus shifts to process efficiency and removing waste. In warehouses and factories, small improvements add up to big productivity gains. Incentives tied to performance benchmarks can boost output and accuracy.

Why “TES 2.0” misses the point

Calling BPO “TES 2.0” misses the point. If the client manages daily tasks, it's still TES. True BPO means the client manages outputs, not people. BPO is not just labour supply—it's a model to optimise work.

Where BPO delivers the greatest impact

BPO works best in high-volume, variable environments like e-commerce, manufacturing, or packaging, where efficiency gains matter most. Output-based models help scale with demand, aligning

costs to throughput. BPO and TES can work in parallel—stable roles on TES, high-volume on BPO.

Measuring what matters

Measurement differs: TES looks at attendance and headcount; BPO focuses on performance metrics.

BPO tracks units produced, accuracy, efficiency, and cost per unit—not just presence, but results.

The productivity question

For businesses experiencing low growth and high costs, productivity is essential. TES is ideal for stabilising capacity, while BPO is better for measurable output, efficiency, and scalable costs. Moving from headcount to output fosters accountability and sustainable productivity.

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TES adds flexible headcount. BPO takes ownership of a process and delivers agreed outcomes. The value is in performance, not the number of staff. The key difference: buying extra hands (TES) versus buying results (BPO).

Turning adversity into advantage: How constraints shaped the StadiLux Floodlight

This good optical design was an economic necessity translated into engineering discipline across the supply chain, production process and project deployment.

Budget constraints and manufacturing ingenuity

Capital expenditure limitations also influenced how StadiLux was industrialised.

Tooling budgets were finite, meaning every jig, die and gauge had to justify its existence. Even when adjusted for inflation, the total tooling investment amounted to less than R1 million - remarkably modest for a product competing with global systems developed at vastly greater cost.

This reality encouraged a manufacturing strategy built around a small number of highly precise tools and production processes that embedded quality directly into the product.

The result was reduced variability, improved repeatability and lower long-term production costs. It also created a platform capable of scaling effectively once StadiLux began appearing in stadium projects involving hundreds of luminaires.

Budget constraints didn't limit ambition, they sharpened it.

Constraint as a filter against complexity

Another overlooked benefit of constraint is its ability to prevent unnecessary complexity.

StadiLux didn't attempt to solve every possible lighting problem. Instead, it focused on a single objective: delivering high-quality, long-throw stadium lighting with minimal wasted light and the smallest practical wind load on the shortest feasible mast structures.

Features that didn't contribute directly to this objective were deliberately excluded. This clarity helped avoid feature creep - a common failure mode in well-funded engineering projects - and resulted in a product that was easier to manufacture, aim, maintain and refine.

Subsequent improvements were incremental and disciplined, preserving backward compatibility and protecting the integrity of the original design.

Competing but not head-on

Perhaps the most disruptive aspect of StadiLux is that it didn't attempt to compete with established global manufacturers on their own terms.

It didn't try to outspend them or out-scale them. Instead, it reframed the problem.

By delivering comparable or better

lighting performance with fewer luminaires, lower installed power and reduced glare, StadiLux offered a different value proposition—particularly attractive in markets where infrastructure costs and energy efficiency were critical considerations.

This reframing allowed a South African-designed product to compete internationally without enormous development budgets or dominant global brands.

Turning adversity into advantage

Looking back, it's clear that StadiLux succeeded not despite its constraints, but because of them.

The necessity to do more with less forced a level of integration, focus and discipline that many better-resourced projects never achieve. The result was a product that delivered measurable performance improvements, proved itself in demanding real-world environments and achieved international success.

For engineers facing today's challenges - whether in energy efficiency, sustainability or infrastructure - the lesson remains relevant.

Constraint, when embraced, can become one of the most powerful drivers of innovation. And sometimes it produces a solution that quietly changes the game.

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JUNE 2026 FEATURES

- DBs, Switches, and Sockets
- Tools and Tooling
- Lighting

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