

EcoStruxure™  
Innovation At Every Level

Reliable, safe operation and  
protection of burners, boilers,  
furnaces and heaters

EcoStruxure™  
Triconex®  
Burner Management Systems

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Life Is On

Schneider  
Electric

# When the safety and protection of your burners, boilers, and heaters is critical to the success of your business, you can rely on EcoStruxure Triconex Safety Systems



## Safe operation of burners, boilers, and heaters

Boilers, burners, ovens and fired heaters are common in the process industries and are critical to process operations. These systems are often complex due to the sequencing and management of multiple different operating modes and states. Initiating safe operating conditions, protection against abnormal or unsafe operating conditions, implementing safety interlocks for normal startup and shutdown, automating ignition and purging activities, operating reliability and availability, complying with standards and regulatory bodies are all fundamental requirements for any burner management system.

EcoStruxure Triconex burner management systems (BMS) monitor, protect, operate and maintain all of your plant's combustion assets safely, reliably, and securely. Our solutions are proven to protect people, the environment while keeping production operating safely and continuously for the operating life of the asset.

As a world leader in safety, our comprehensive blend of safety-certified products, together with our team of safety professionals, makes us the ideal partner for your burner management needs. Schneider Electric is the world's leading supplier of triple modular redundant (TMR) safety systems, with over 15,000 systems operating safely for more than 1 billion hours.

EcoStruxure Triconex Safety Systems represent the best possible decision for your burner management needs:

- Safer, more reliable, uninterrupted operations
- Increase plant uptime, minimize unplanned downtime and potential production loss
- Avoid costly harm to plant assets, reputational damage, regulatory compliance fines
- Lower operational risk, impact on health, safety and the environment
- Maximize value of ownership
- Potentially lower insurance costs



# 01

## Experience

### A wide range of experience

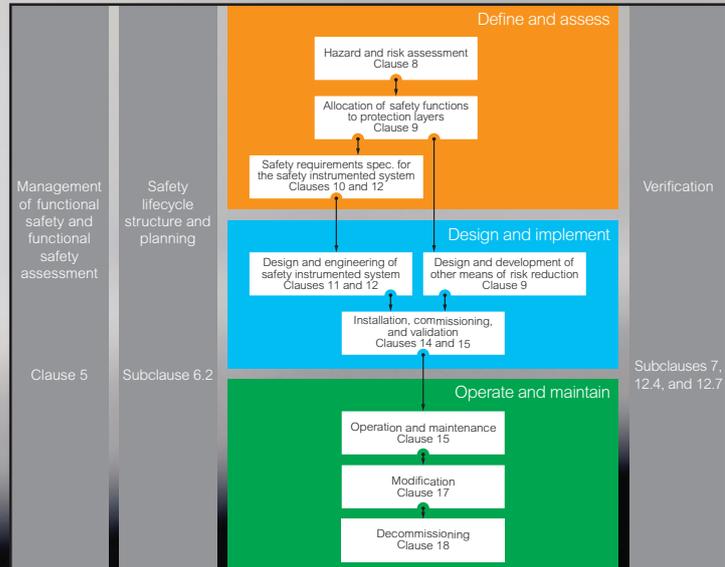
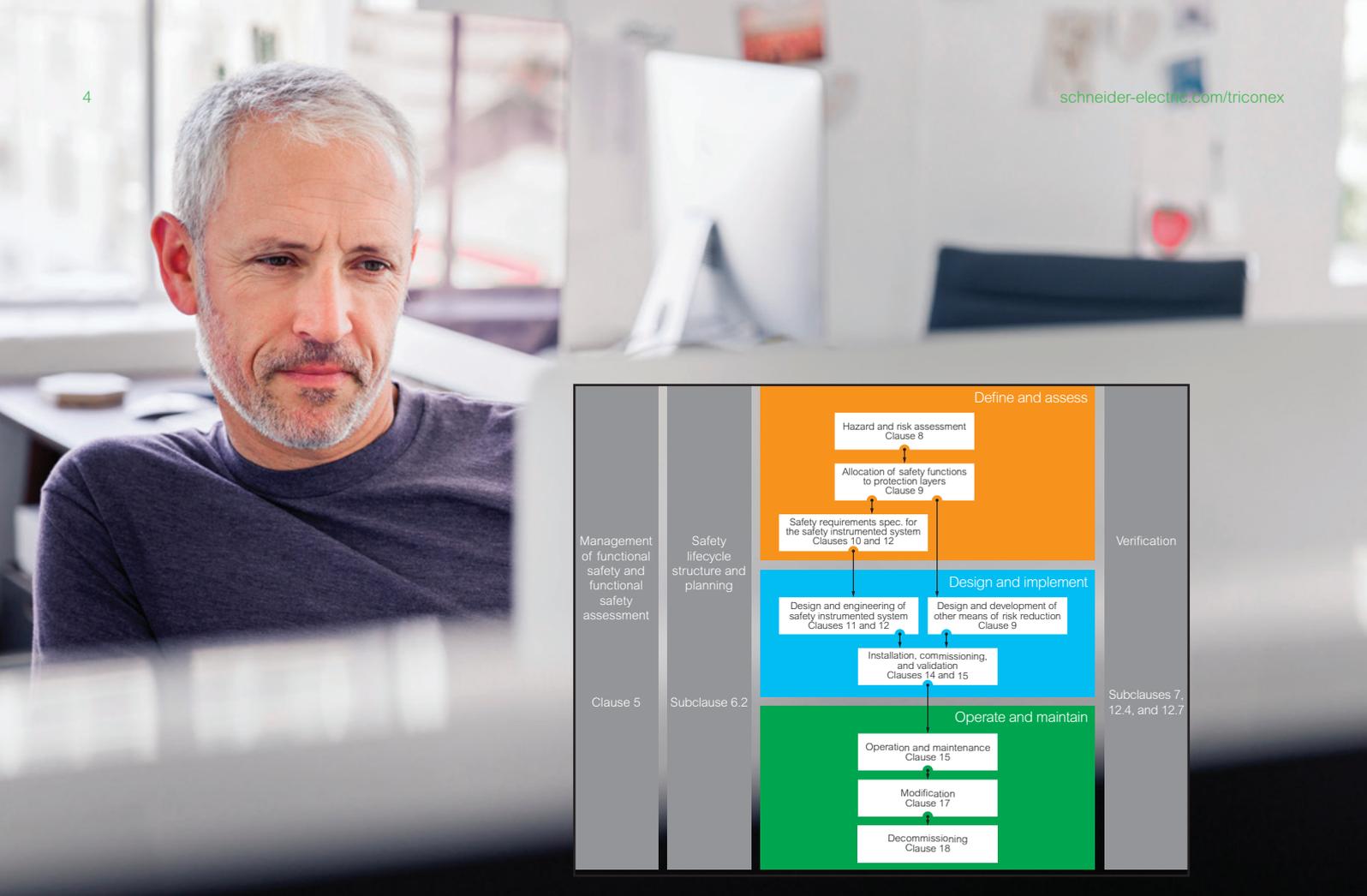
Drawing on our extensive expertise, Schneider Electric has designed and implemented Burner Management Systems for a wide range of boiler and fuel types, including:

#### **Boiler types:**

- Power utility boilers
- Industrial heaters
- Ethylene cracking furnaces
- CO boilers (FCCU)
- Special coker furnaces (DCU)
- Crude furnaces (crude units)
- Thermal oxidisers (SRU)
- Front fired, cyclone fired, opposed fired
- Circulating fluidized bed
- Down fired turbo furnace
- Recovery boilers
- Heat recovery steam generators

#### **Fuel types:**

- Natural gas
- Process gas
- Coke oven gas
- Light oils
- Heavy oils
- Petroleum coke
- Coal
- Low BTU gas
- Refuse derived fuel



## 02 | Expertise

### Providing expertise every step of the way

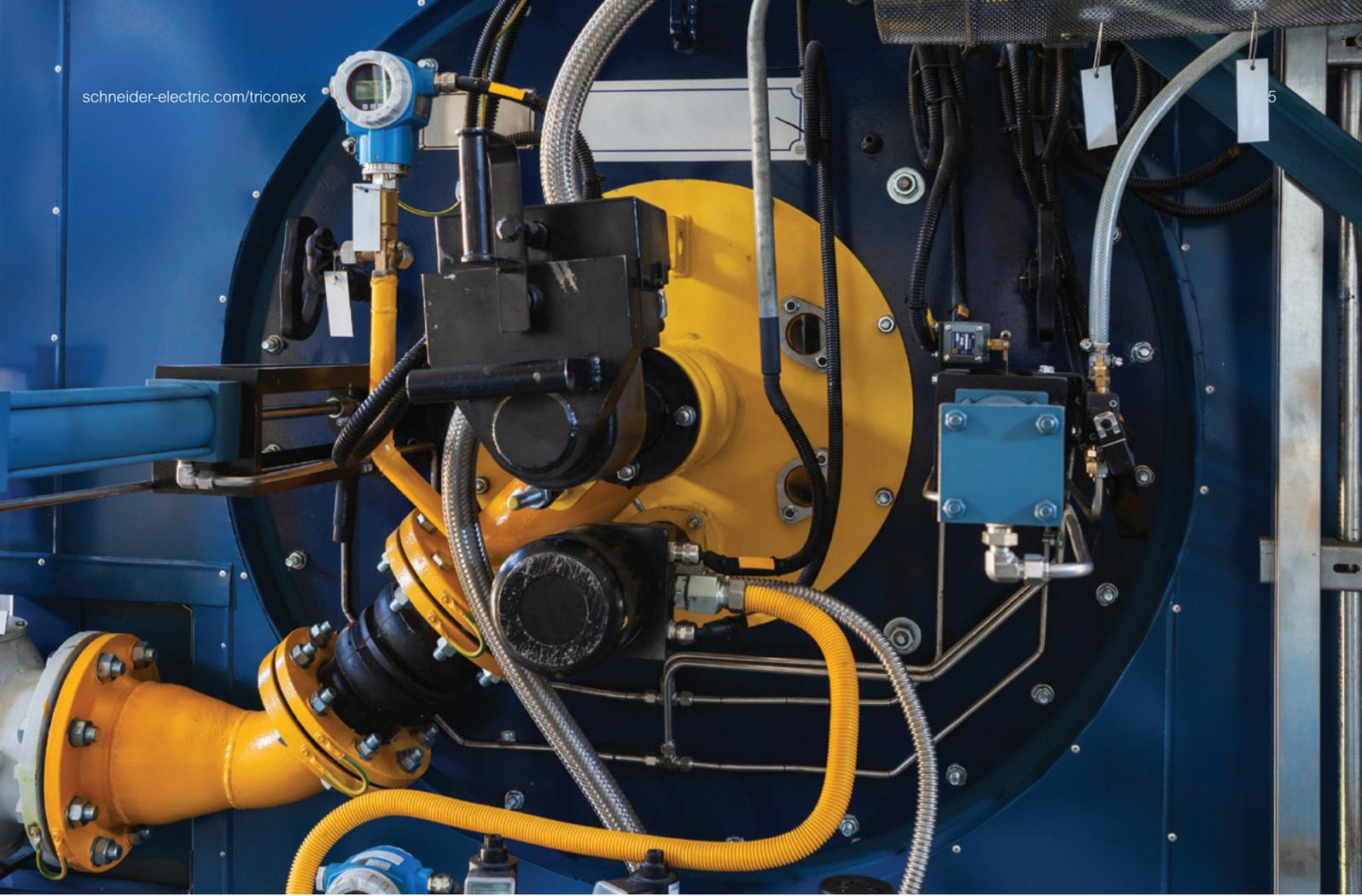
Implementing a successful burner management system project involves more than just reliable technology. Burner management systems can be complex and require in-depth and specialist knowledge. It requires a team of engineers with technical expertise and project management knowledge to bring these components together into a properly functioning system.

We provide complete turnkey solutions that function as stand-alone or tightly integrated system as part of an overall plant control strategy.

All of our services are delivered by competent, knowledgeable and experienced safety experts. Many are TÜV certified Functional Safety Engineers as well as accredited Functional Safety Experts who have proven skills and competencies to carry out the activities for which they are accountable.

Our knowledgeable and experienced professionals keep pace with technology changes and industry requirements allowing us to handle diverse project scopes and sizes, for new or retrofit upgrades. The processes and procedures that they follow are also certified by TÜV in alignment with IEC61511.

Supported by a global infrastructure, you are assured to be supported by a partner with the expertise and commitment every step of the way.



# 03

## Engineering excellence

### Up-front analysis and consulting

Our team of safety consulting engineers will perform on-site surveys of existing BMS equipment and make recommendations for improved safety, reliability, and standards compliance. If required, we can perform a complete hazard analysis to ensure that an objective critique of the process is incorporated into the project.

### Modular approach reduces engineering

Our extensive experience with all types of combustion processes and fuels, coupled with their repeated use of our proven technologies, has enabled the development of modular packaged burner management systems.

The system is configured using a library of proven application logic modules, which can be customized to meet the unique requirements of each project. These logic modules are building blocks consisting of logic drawings, application programs, and HMI graphics for various BMS functions.

The logic modules are carefully designed and tested, and comply with applicable codes and standards such as the National Fire Protection Agency (NFPA), Factory Mutual (FM), and Industrial Risk Insurers (IRI).

This modular design approach successfully eliminates significant time and costs required in the design, configuration, and check-out of the BMS system.



## 04 | Lifecycle services

### Expertise, solutions, and services for life

Supported by a global infrastructure, you are assured of a partner with the expertise and commitment every step of the way, where ever and when ever you need them. We offer full range of services including:

- Functional safety gap assessment and closure
- Process hazard analysis (PHA)
- Layer of protection analysis (LOPA)
- Independent protective layer (IPL) and safety integrity level (SIL) selection
- SIS front-end loading (FEL)
- Quantitative risk assessment (QRA)
- SIL determination and verification calculations
- Safety requirements specification (SRS) generation
- Functional safety management planning (FSMP)
- Front-end engineering design
- Project management services
- End-to-end BMS design
- Detailed engineering, system configuration, build, test, and documentation
- Installation, commissioning, and startup assistance
- Training to ensure the competencies and skills are available at site
- Post-delivery support such as expert hotline, spare parts management, on-site support, system maintenance, and system upgrades



# 05

## Technology you can depend on

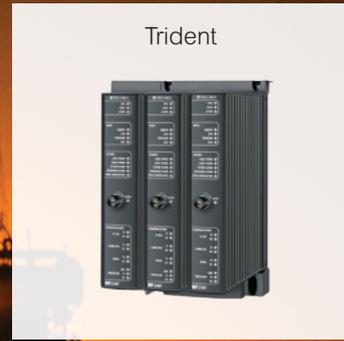
### Technology you can depend on

EcoStruxure Triconex Safety Systems are renowned throughout the world for safety, availability and security, and can be used for all major safety and critical control applications including burner management.

**Availability:** a major goal for every boiler operator is to safely maximize unit availability since downtime results in lost revenue and increased operating costs. The unsurpassed availability of EcoStruxure Triconex Safety Systems reduce unscheduled downtime due to a spurious trip or control system error. The architecture, diagnostics, and online repair capability eliminate costly shutdowns and downtime.

**Reliability:** EcoStruxure Triconex Safety Systems are designed to reliably operate in the harsh conditions of extreme temperatures, humidity, corrosive atmospheres, shock, vibration, and electrical interference often associated with boilers and furnaces. The MTTF spurious of a typical TMR system is shown to exceed 1,000 years.

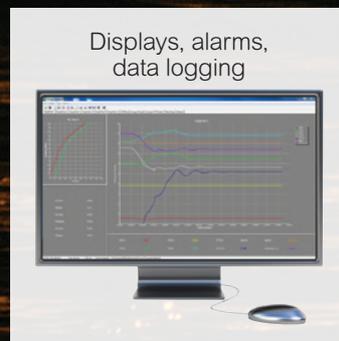
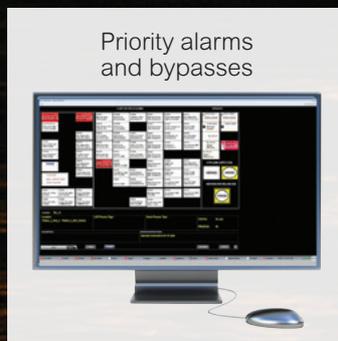
**Maintainability:** embedded diagnostics are executed automatically, allowing the system to quickly detect a wide range of system issues. No special programming is required. System diagnostics are easily displayed on engineering stations, reducing the time to troubleshoot issues.



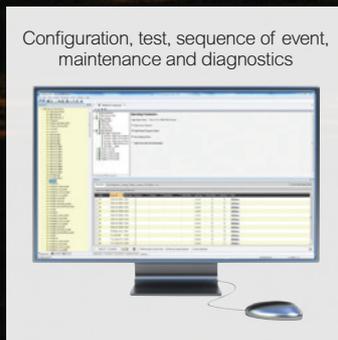
Safety instrumented systems



Industrial performance and productivity tools



Engineering, operational, and maintenance tools





# 06

## Conformance to industry standards

### Compliant with all major standards\*

Our proven family of high availability and high integrity systems Tricon, Tricon CX, Trident, Tri-GP meet the stringent needs of applications in high hazard industries and are certified to all relevant standards, including:

#### IEC

IEC 61508, Parts 1-7, 2010  
 IEC 61511:2004  
 IEC 61131-2:2007  
 IEC 61326-3-1:2008

#### ISA

ANSI/ISA-84.00.01-2004  
 (IEC 61511-1 Mod)

#### EN

EN50156-1:2004  
 EN 50178:1998  
 EN 298:203  
 EN 54-2:1997/A1:2006a

#### NFPA

NFPA 72:2007  
 NFPA 85:2007  
 NFPA 86:2011

#### Canadian Standards Association

CAN/CSA-C22.2 No.0-M91  
 CSA Std C22.2 No.0.4-M1982  
 CAN/CSA C22.2 No 1010.1-92  
 UL 3121-1 1998-07-14

#### European Union CE Mark

IEC 61131-2

#### Factory Mutual

3611  
 3810  
 3600

#### Bureau Veritas

BV NR467:2013, Part C, Ch 2-3

\* Please check the individual product specifications for applicable certifications.



# 07

## Training

### Dedicated training for burner management systems

This two day course provides a general overview of burner management systems (BMS). The course is intended for engineers and technicians who are new to burner management, or those who want to gain a better understanding of the standards and subsequent design path they need to follow to implement a safety related system for a burner management application.

#### Who should attend?

The intended audience of the sources is engineers and technicians who are new to burner management, or those who want to gain a better understanding of the standards and design path they need to follow to implement a safety related systems for a burner.

#### Learning Outcomes

- Recognize when a BMS is required
- At a high level, identify a possible non-compliant BMS
- List the basic requirements for a BMS
- Provide feedback on a BMS solution, advising improvements are practicable
- List key standards relevant to a BMS
- Discuss the functional safety lifecycle
- Discuss when grandfathering of a BMS is practicable
- Identify typical safety loops in a BMS



### Course objectives

The course will provide a general understanding of prescriptive standards such as NFPA85, 86 and performance based standards such as IEC61511 and TR84.00.05 for BMS systems.

- Fundamentals of burners/boilers
- Why burner management systems are needed
- Components that make up a BMS
- Relevant safety and application standards and their relationship to regulatory requirements
- The IEC61511 functional safety lifecycle and its use in BMS design and implementation
- Grandfathering of non-compliant controls
- Meet regulatory requirements
- Typical safety loops and valve train requirements in a simple BMS/boiler
- Design for logic solvers and field devices
- Operational and maintenance requirements including overrides and bypasses
- Examples of SIL allocation and verification for a typical BMS safety instrumented function

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