

## Integrated Safety Control

### Hardwired Safety Control for Emergency Diesel Generators (EDG)

Framatome's integrated electronic safety control represents a pre-qualified stand alone system built-up of discrete hardwired components. Framatome's superior know-how guarantees customized solutions at best price

#### Challenge

EDG safety controls must operate safely and reliable to assure the emergency power during design base events of Nuclear Power Plants (NPPs). Single failure and diversification considerations shall be fulfilled by such controls. In addition self-monitoring, simple design, easy maintenance and repair must keep the potential risk of outage times due to repairs at a minimum. Furthermore the implications from the qualification concerns of digital controls demand a simple and robust alternative control.

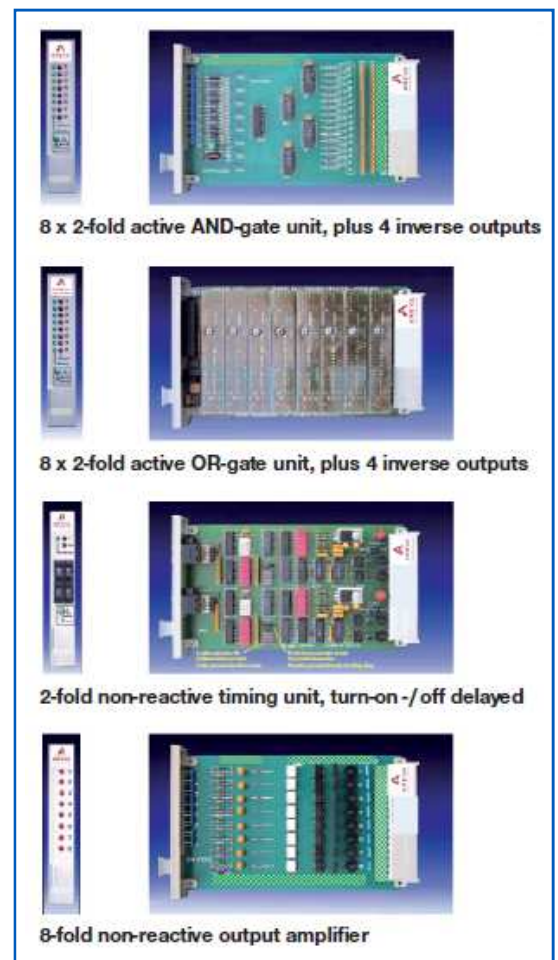
#### Solution

The integrated electronic EDG safety control incorporates long-term experience of Framatome with an ideal system set-up for NPPs. It considers different infrastructures by modular interface configuration.

As a possible diversification of digital systems it is based on electronic technology with a long tradition and proof of suitability of the individual boards.

The maintenance is supported by the interchangeability of these integrated electronic modules. The project specific modification of this I&C system is realized by the hardwired interconnections of the various modules.

All modules can also be utilized in a redundant setup even with a certain degree of diversification for highest availability and reliability.



Realization of all required safety functions in software-free Integrated electronic draw-out units

## Technical information

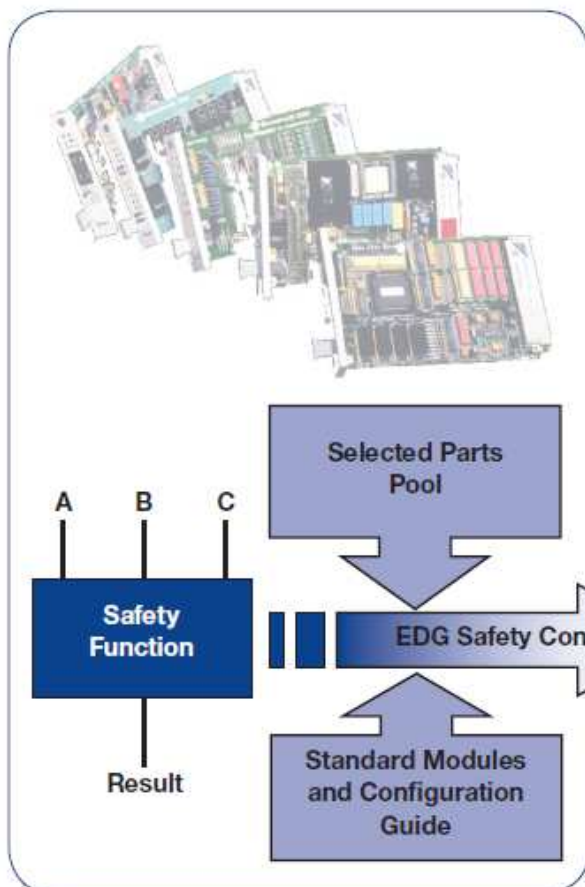
- Global requirements for world wide application with different engine types
- Covers all required EDG safety functions
- Software-free
- Separation of safety classes 1E and N1E with integrated priority management
- Analogous and binary inputs/outputs
- Reaction times: ~ 3 - 10 ms
- MTBF: >200 years
- Qualified and fit-for-function selected discrete devices for the various control functions
- Slim footprint by draw-out units in 19" frame units in standard seismic proven cubicle

## References

Framatome is a specialist for digital, electronic and analogous I&C technology in NPPs. Vast experience with reactor protection systems from the last 35 years is also tapped to build reliable EDG safety control controls.

Collected experience with different applicable regulations (IEEE, RCC-E, KTA) all over the world allows enveloping design covering various standards.

The enveloping design of integrated electronic EDG safety control modules allows worldwide application. This improves reliable and cost efficient project execution for our customers.



Design Process Principle

## Customer benefits

- Easy system integration and qualification through modular concept
- Software-free solution for easy qualification approval
- Modular extension with integrated test logics
- Included spare parts management and easy replacement of obsolete devices



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