WISE DESIGN AFRICA

Since 1997

MCC

MOTOR CONTROL CENTER

Power For Life

www.wisedesignafrica.com

The tested switchboard, complying with IEC 60439

Allen-Bradley SIEMENS ESASA EMERSON. ABB

Design, Construction & Commissioning of Motor Control Centers
DCS Control Panels and PLC Control Panels
Instrumentation Control Panels
Power Factor Control Panels
Containerized MCC's

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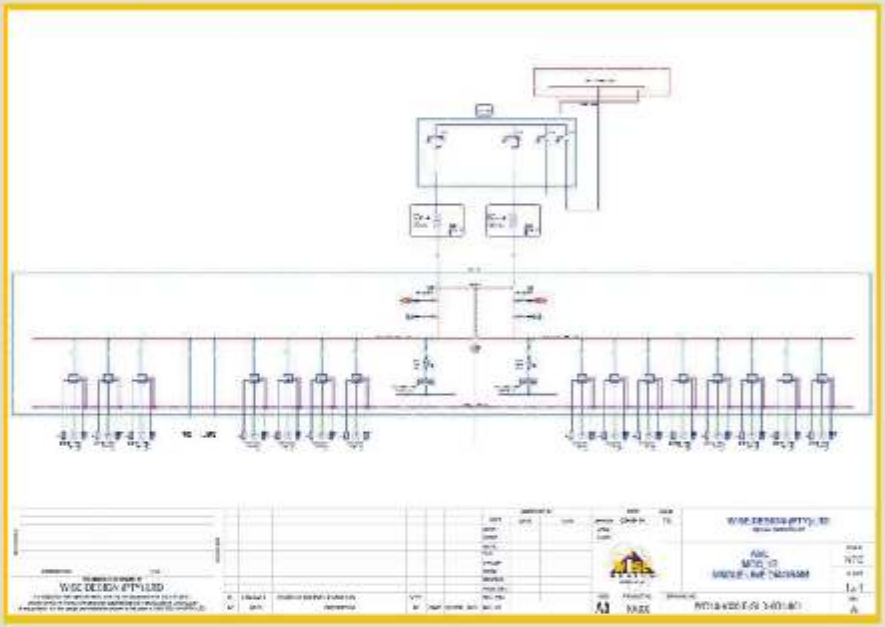
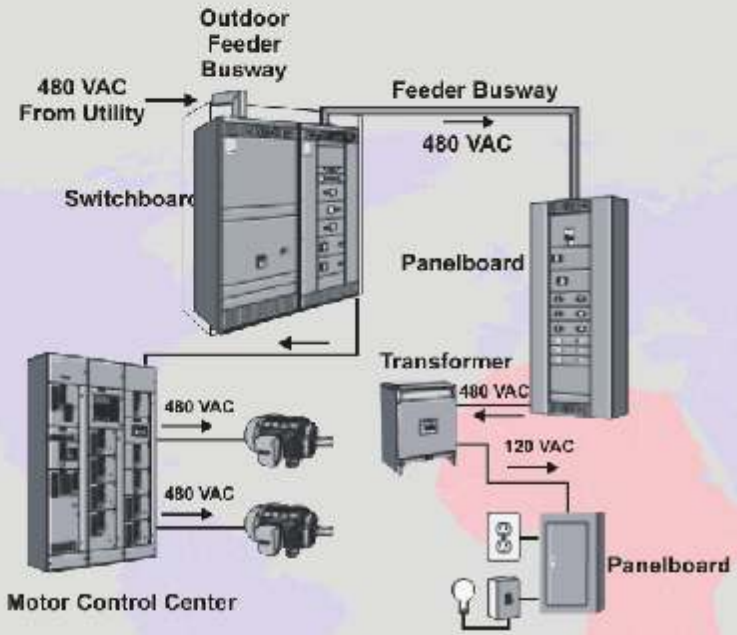
PROCUREMENT **CONSTRUCTION** **COMMISSIONING** **MAINTENANCE**

Wise Design Africa is a leading designer, manufacturer and distributor of electrical products to the South African market as well as the rest of Africa. Wise Design provides customised electrical solutions and switchboard systems to a wide variety of industries.

Our IEC Motor Control Centres are designed to meet the requirements of IEC 60439-1. With over 15 years of motor control experience, our assemblies meet global standards with high density columns and high short circuit withstand ratings. All our type-tested enclosures are designed to exceed your expectations for safety, performance and reliability.

Typical Single Line Diagram of a Motor Control Centre





Definition: A combination of one or more low-voltage switching devices together with associated control, measuring, signalling, protective, regulating equipment, etc., completely assembled under the responsibility of the manufacturer with all the internal electrical and mechanical interconnections and structural parts.

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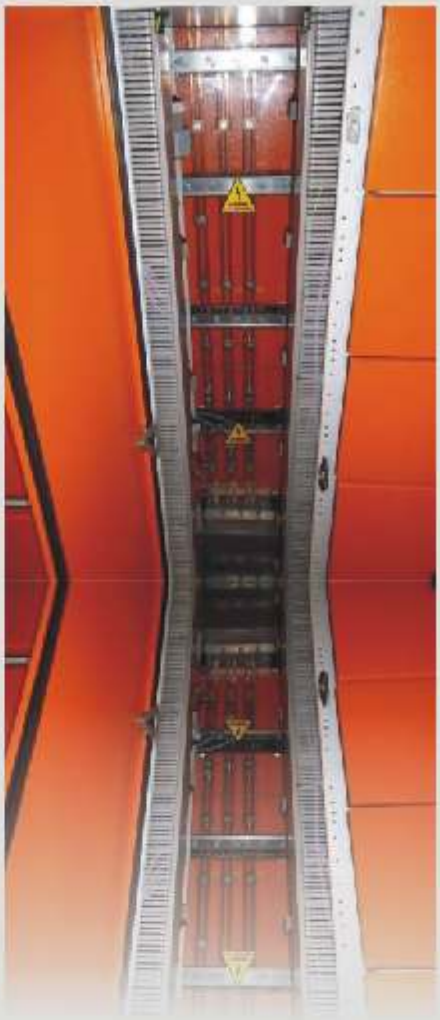
Type-tested busbar systems



- Wise Design's type-tested busbar systems consists of standard components and cover current-carrying capacity range up to 8750 amps.
- The systems are tested by KEMA and ASTA according to IEC / EN 60439-1 Maximum short-circuit level of 120 kA for 1 sec. and a peak withstand current of max. 264kA.
- The busbar sections are easily assembled. The assembly bolt allows for an adjustable connection.

IEC 60439 series Low-voltage switchgear and controlgear assemblies

IEC 60439 series
Low- voltage switchgear and controlgear assemblies

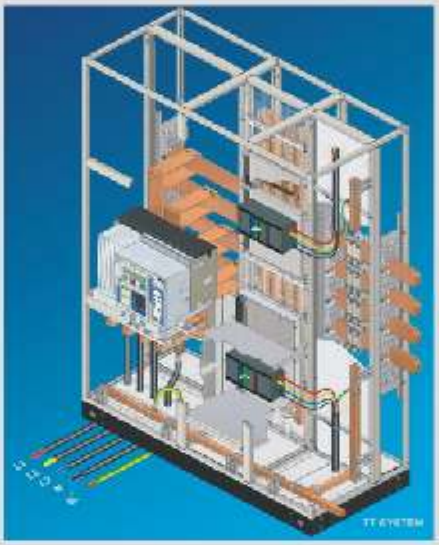
- One general standard :
  - IEC 60439-1 type-tested assemblies (TTA) and partially type-tested assemblies (PTTA)
  - Four related standards:
  - iEC 60439 -2 busbar trunking systems (busways)
  - iEC 60439 -3 distribution boards (<250A,)
  - iEC 60439 -4 assemblies for construction sites (ACSs)
  - iEC 60439 -5 cable distribution cabinets (CDCs)

Low-voltage switchgear and controlgear assembly, TTA or PTTA, whose rated voltage is ≤ 1000 Vac or 1500 Vdc.

- TTA : type-tested assemblies conforming to an established type or system without deviations likely to significantly influence the performance, from the typical ASSEMBLY verified to be in accordance with this standard. A full range of representative configurations have been tested.
- PTTA : partially type-tested assemblies, containing both type-tested and non type-tested arrangements provided that the latter are derived (e.g. by calculation) from type-tested arrangements which have complied with the relevant tests. Some limited configurations may be tested.

IEC 60439-1 standard gives general rules for switchboards construction

- Meeting IEC 60439-1 requirements means :
  - a minimum level of safety for people and equipment
  - to include the low-voltage switchgear and controlgear assemblies for the power distribution and control
  - precise requirements for service conditions (temperature...) construction requirements (IP, IK, forms,...)
  - precise test procedures
- IEC 60439-1: one worldwide standard for all the professionals of switchboards.

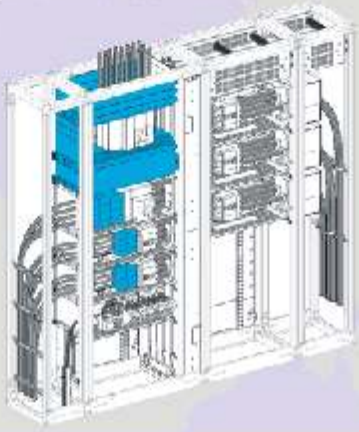


Classification according to IEC 60439-1 which deals with:

- external design *(open-type, dead front, enclosed, busway)*
- place of installation *(indoor -outdoor)*
- conditions of installation with respect to mobility *(stationary -movable)*
- degree of protection *(for outdoor IPt3X)*
- type of enclosure (e.g metallic or plastic)
- method of mounting *(fixed or removable)*
- measures of protection of persons
- form of internal separation *(to be detailed, agreement between customer and manufacturer)*
- types of electrical connections of functional units *(to be detailed, agreement between customer and manufacturer)*

IEC 60439-1 proposes different type of secured forms adapted to each situation

- In most installations, no particular partitioning is needed, electrical switchboard of the form 1 type is acceptable.
  - However this is no longer true without a front plate or other equivalent means. The user shall not have access to live parts.
- Following forms 2, 3 and 4 introduce additional partitioning within the switchboard
  - Form 2: partitioning of busbars
  - Form 3a and 3b:
    - functional units separated from each other and separated from the basbars
    - connecting terminals separated from busbars
  - Form 4a and 4b:
    - functional units separated from each other and separated from the busbars
    - connecting terminals separated from each other and separated from busbars.



IEC 60439-1, what about the scope?

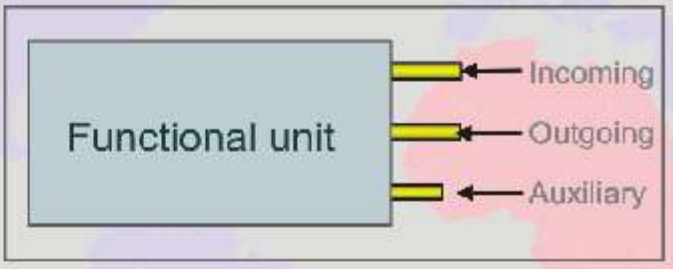
Scope : Low-voltage switchgear and controlgear assembly, TTA or PTTA, whose rated voltage is 1000 Vac or 1500 Vdc.

- **TTA : type-tested assemblies** conforming to an established type or system without deviations likely to significantly influence the performance, from the typical ASSEMBLY verified to be in accordance with this standard. **Full range of representative configurations have been tested.**
- **PTTA: partially type-tested assemblies**, containing both type-tested and non type-tested arrangements provided that the latter are derived (e.g. by calculation) from type tested arrangements which have complied with the relevant tests. **Some limited configurations may be tested.**

Definition: combination of one or more low-voltage switching devices together with associate control, measuring, signalling, protective, regulating equipment, etc., completely assembled under the responsibility of the manufacturer with all the internal electrical and mechanical interconnections and structural parts

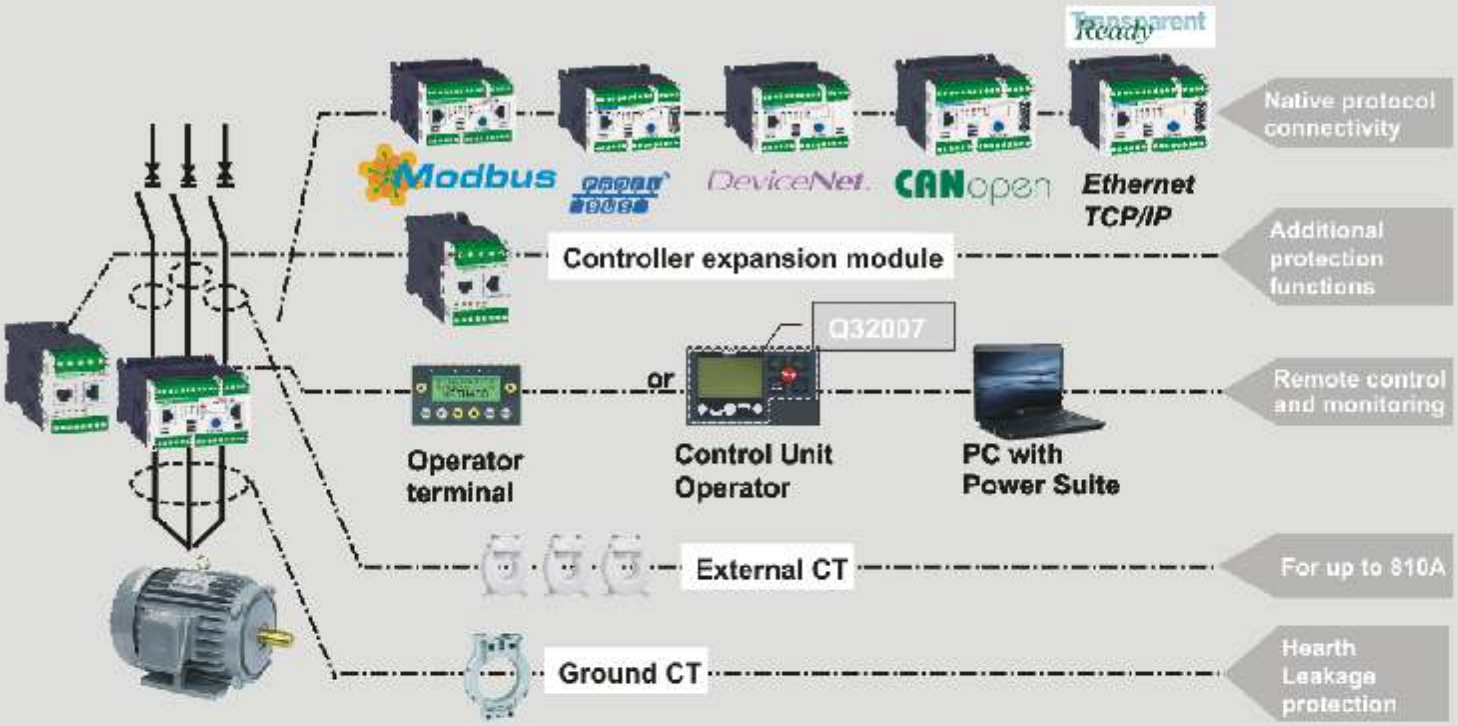
IEC 60439-1: Functional Unit

Definition : Part of an assembly, comprising all the electrical and mechanical elements that contribute to the fulfilment of the same function



Example : drawer in a Motor Control Centre switchboard

A COMPREHENSIVE AND ADVANCED OFFER



SIMOCODE pro V - Variable

Current Measuring Module

0.3 A - 630 A
Straight-through/
busbar connection
technology

Connection Cable
In various lengths
(up to 2m)

Basic Unit 2
4 I / 3 O binary
Thermistor
PROFIBUS-DP
110 - 240 V UC

Current/Voltage Measuring Module

0.3 A - 630 A /
690 V
Straight-through /
busbar connection
technology

Operator Panel
5 buttons / 10 LEDs

Expansion modules
- 4I / 2 O x binary
- 2I / 1 O x 0/4 - 20 mA
- 3 x sensors Pt100/Pt1000
- External earth faultvia summation current transformer

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DRIVE RATINGS INFORMATION - PANEL MOUNTED

220V 1Ph - 0.37 to 1.5kW (Size 0 only)

220V - 0.37 to 45kW Size 0 - 5

400V - 0.37 to 132kW Size 0 - 6

500V - 3.0 to 132kW Size 3 - 6

690V - 18.5 to 132kW Size 4 - 6

* Based on Normal Duty Operation.

THE TESTS OF STANDARD IEC 60439-1

There are two types of tests:

- **7 type tests are performed by the manufacturer on one or several configurations:**

  n° 1 - Temperature rise limits
  n° 2 - Di-electric properties
  n° 3 - Short-circuit withstand
  n° 4 - Protective circuit effectiveness
  n° 5 - Clearances and creepage distances
  n° 6 - Mechanical operation
  n° 7 - Degree of protection.

- **3 routine tests are performed by the panelbuilder on each particular switchboard:**

  n° 8 - General inspection
  n° 9 - Insulation/dielectric test
  n° 10 - Protection measures.

The standard guarantees that the switchboard complies with the necessary standard requirement

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