TABULA

Modular System of Low Voltage Switchboards and Switchgears

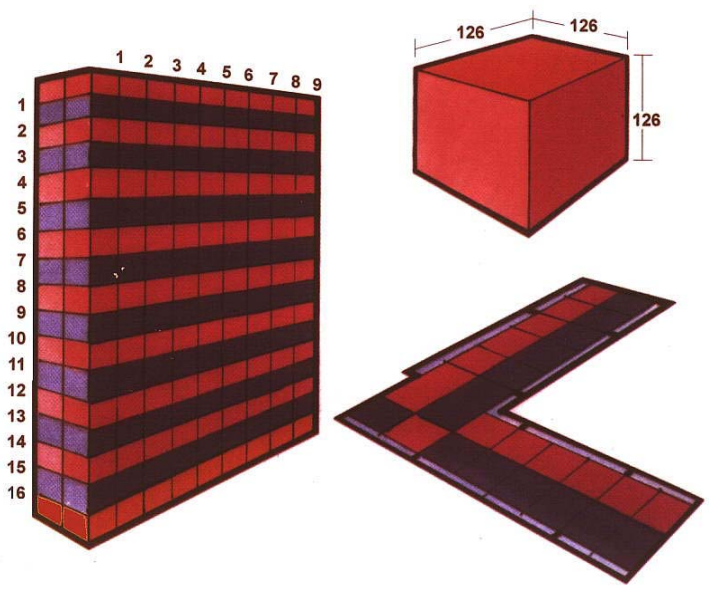
KI.06.2012

Certified acc. to ISO 9001:2000

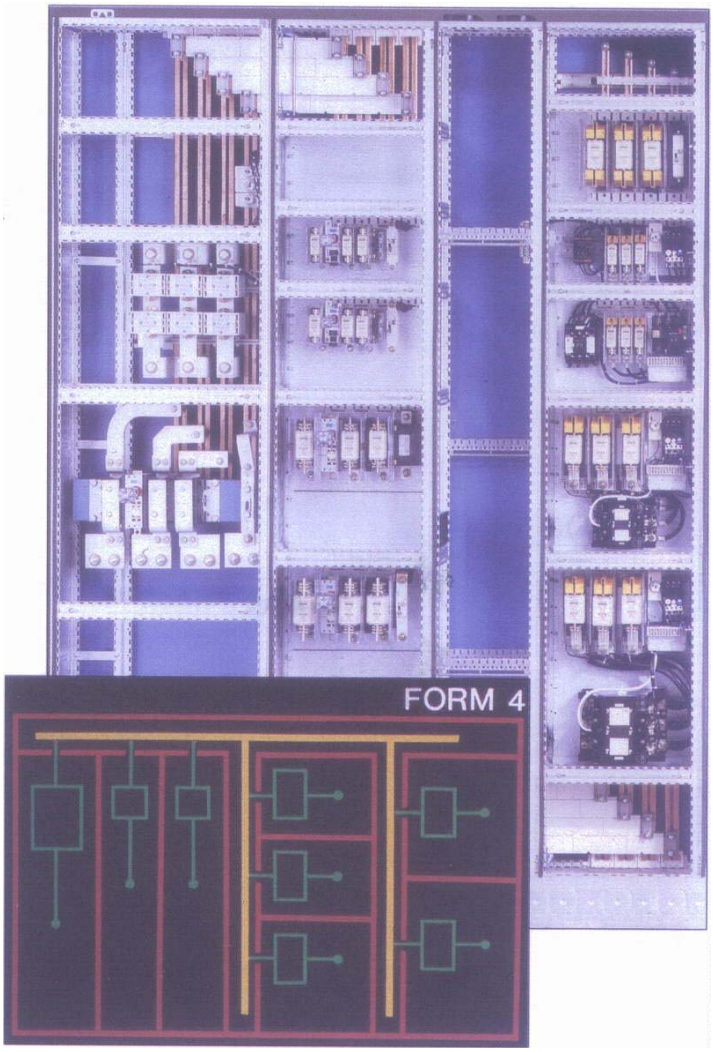
ISO 9001 Akredytacja PCA

ELMOR

Control gears and switchboards are nowadays a very important element in modern production engineering, in the systems connected with generation, transmission, distribution and processing of the electric energy.
Many important life domains depend on reliable work of these gears.
We propose you switchboards and switchgears designed in the system TABULA, which provides to build cost effective and high reliable devices.



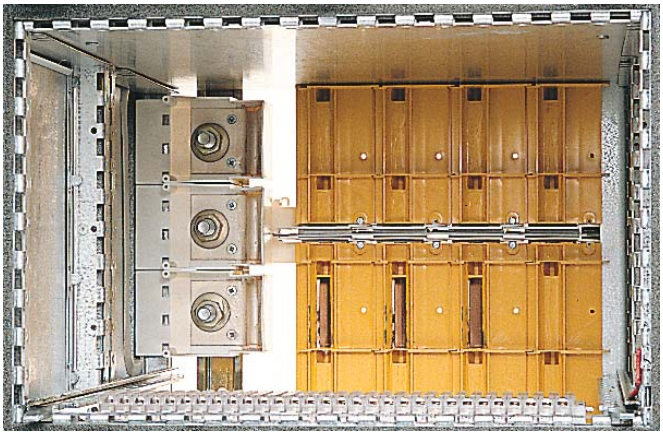
The system TABULA has been on a three-dimensional module 126 mm in all three directions: height, width and depth. All components e.g.: main elements of housings like doors, insulation barriers, montage plates and bus-bars are based on this dimension.
The contemporary market demands that all kinds of components could be assembled in switchboards.
Flexibility of the system TABULA provides practically unrestricted assembly possibilities.
The system TABULA enables to build a switchboard consisting of any amount of the modules.
Height, width and depth of the switchboard can be so matched, that it could comply all requirements.
Building of the switchboard at the angle of 90° is simple using typical elements of this system.



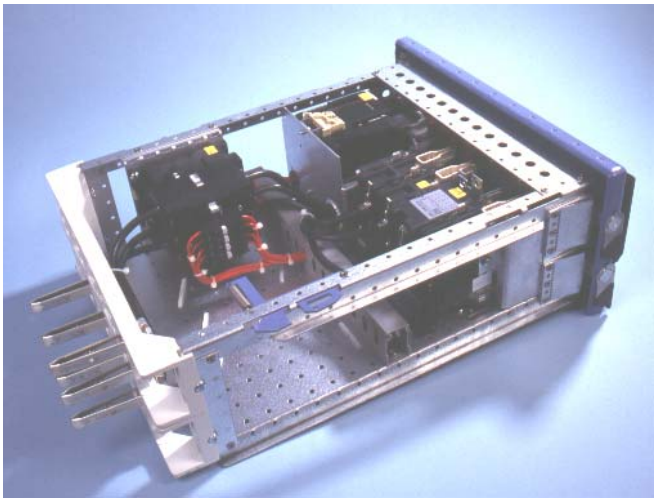
Besides the reliability, users demand also safety for persons working at service, inspections and maintenance of the control gears and switchboards. Forms of inside division into compartments are determined in PN-IEC 439-1+AC.
The inside division into compartments by means of fixed barriers and protection shields ensures:
- protection against touch of alive parts belonging to a neighbouring functional block
- decreasing of arc fault probability
- limitation of arc fault effects to a compartment in which it has occurred
- protection against moving of constant parts from one compartment to next one.
The *forms 1, 2, 3,* and *4* determined in the a.m. standard allow to reach successively more higher protection degree for persons i.e. protection against accidental touch of alive parts and protection against electric arc effects.
The system TABULA enables to build switchboards and control gears divided into compartments acc. to any chosen form.

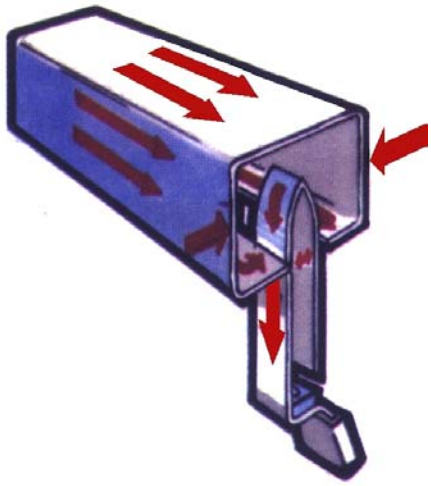
Operational reliability has big influence to exploitation costs. Failures causing shutdowns can be expensive.
Applying a switchboard with withdrawable drawers of the system TABULA, the time without supplying the consumers will be reduced to the time necessary for taking out a drawer from a compartment and replacement it with a new one.

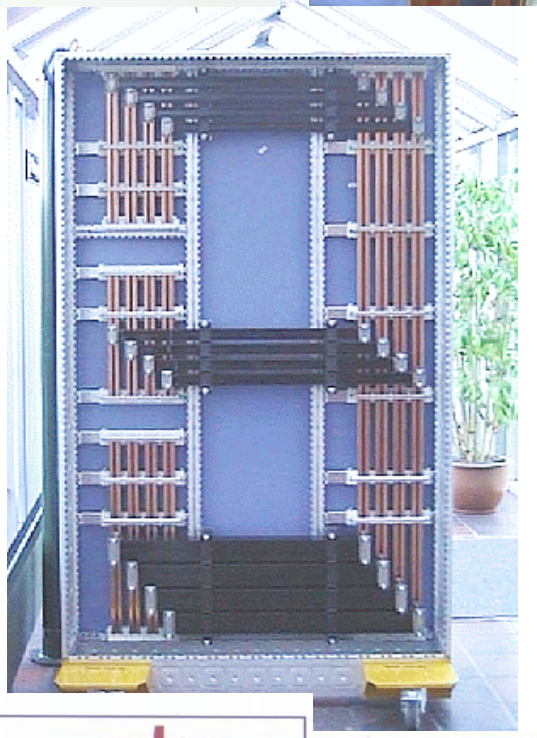
The switchboards with withdrawable drawers can be build with the inside division into compartments acc. to the *form 4*. It means, that every functional block placed in the withdrawable unit has its own compartment in the fixed unit of the switchboard which together with terminals of main and auxiliary circuits is separated from neighbouring compartments and bus-bars system by means of barriers ensuring the protection degree IP20.
The design system TABULA complies the requirements contained in PN-IEC 439-1 + AC for the highest protection degree of persons during service, inspection and maintenance of the switchboard.

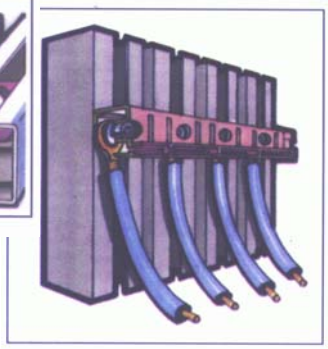


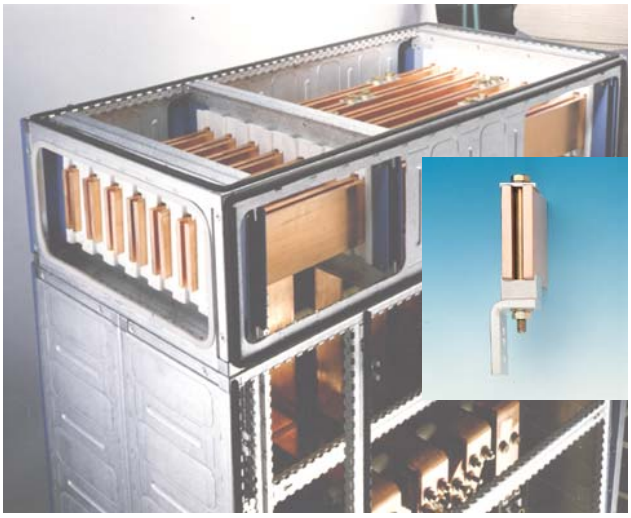
Connecting of the main circuit between a withdrawable unit and a fixed one follows by insertion the finger contacts placed in a back part of the withdrawable unit into slots of C-profiled vertical bus-bars.
Load-carrying capacity of one contact is 125 A, for bigger currents they should be connected in parallel.
Design of the finger contact together wit C-profiled bus-bars ensures bigger press of a connected place during shot-circuit current passage.
The switchboard with withdrawable units of the system TABULA gives the possibility to carry out functional tests of auxiliary circuits assuring safety insulation clearance in the main circuit.
An inter-unit connector of auxiliary circuits is placed in a lower part of a compartment of every functional block.
Design of this connector enables direct connection of external circuits.
Load-carrying capacity of sliding contacts is 5 mA to 16 A.











The system TABULA owns good designed bus-bars systems, which allow to obtain:
- max. rated continuous current at min. material consumption,
- very high withstand to short-circuit currents,
- quick assembly and simple ways of connections and attachments.

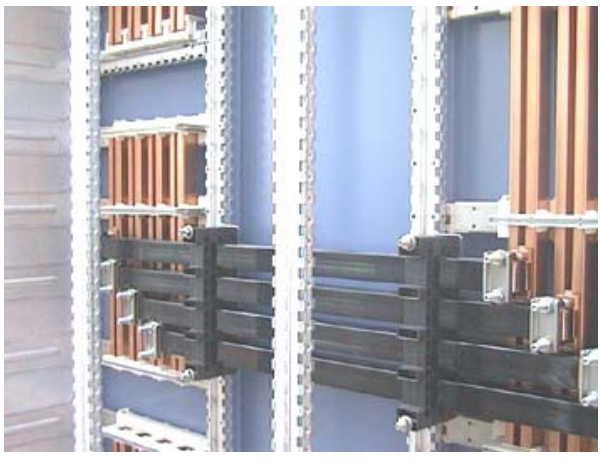
Vertical bus-bars of load-carrying capacity 1600 A have got a cross-section shaped C. Connections and branches are made by using a special nut, which can be inserted into C-profile inside, even when the bus-bars have already been assembled inside the switchboard. The nut can be put in any place of the bus-bars and will stay in this place even when the connection is removed.

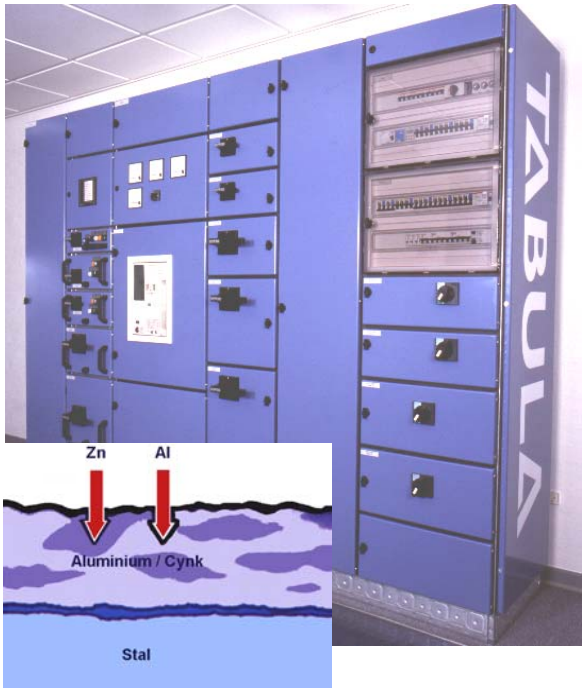
Connection of the circuits of load-carrying capacity 400 A can be done by means of an attachment set, which together with a montage plate makes a complete set which can be simply assembled and disconnected from front. This design offers reliable screw connection and easy assembly.

One of the latest solution is double-unit switchgear with semi draw-out units. This is an economical alternative to the construction with withdrawable units. Unscrewing of four screws enable taking out the functional block ensuring the IP2X protection degree. Replacement of the apparatuses and extension the switchboard can be executed without turning of the voltage on horizontal bus-bars.

Horizontal bus-bars are made of standard flat bars of following cross-sections: 17x3 mm to 100x10 mm.
In case of rated currents to 2200 A the horizontal bus-bars are placed in insulations shields.

Bus-bars of load-carrying capacity from 3000 A to 7800 A are mounted in separate compartments made of standard elements of the system TABULA. It is not necessary to make drilling in order to connect horizontal and vertical bus-bars.
Connections are of clamp-type and they are always ready to extension.
This assembly system allows to carry out all the maintenance activities from front.





The switchgears of the system TABULA can be installed in each kind of environment, in an office and in very aggressive industrial environment as well.
The basic material and painting have been so selected that they look aesthetically for long time.
All main construction elements besides painted doors and shields are made of Aluzinc, a material of high corrosion resistance.
Aluzinc is a high quality steel sheet covered with Alu-Zinc coat consisting of 55% Aluminium , 43,4% Zinc and 1,6% Silicon.

Zinc ensures cathode protection of cut edges and protects against scratches. Aliminium gives general protection for long-lasting use. The carried-out tests showed that Aluzinc is 3 to 7 times more resistant to corrosion than a hot coated Zinc sheet.
Shields and doors are made of high quality phosphate treated steel sheet.
Epoxide dry powder coated by means of electrostatic method creates a surface. This method of painting ensures durable and high quality surface.

Control switchgears and switchboards build in the system TABULA are ready to install in all networks systems defined in PN-91/E-05009 and IEC-346 designated as the systems of type TN, TT and IT.

Technical data:

- Rated insulation voltage	**1000V**
- Rated frequency	**50÷60Hz**
- Continuous rated current of	
Horizontal bus-bars	**250÷7800A**
Vertical bus-bars	**225÷1600A**
- Rated short-time withstand current (1 sec.) of	
Horizontal bus-bars	**to 115kA**
Vertical bus-bars	**to 91kA**
- Rated peak withstand current of	
Horizontal bus-bars	**do 253kA**
Vertical bus-bars	**do 200kA**
- Protection degree	**IP 20÷IP 54**
- Dielectric test voltage	**3500V /min**
- Inside division *forms* 1, 2, 3 and 4 acc. to PN-IEC 439-1+AC and IEC 439-1 and BS 5486	
- Colour	**RAL 5023**
	RAL 7032

Test an Certificates

KEMA	- Holland
ASTA	- England
DEMKO	- Denmark
SETI	- Finland
ELEKTRONIKCENTRALEN	- Denmark
SYDNEY CUTY COUNUL	- Australia
NEFI	- Norway

Standards and Norms

ICE 439-1
BS 5486-1
DIN 57660 Teil 500
VDE 0660 Teil 500
SEN 362130
NEN 2439
NBN 663 - 439
KEMA M15B
PN - IEC 439-1+AC

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