



## Capitole 20 Low Voltage distribution systems

Product Focus

Reliable, safe and  
standardised design



## Eaton's European Operations electrical business

Eaton's electrical business is a global leader in electrical control, power distribution, uninterruptible power supply and industrial automation products and services.

Eaton's European brands including Holec, MEM, Powerware and Eaton, provide customer-driven PowerChain™ Management solutions to serve the power system needs of the industrial, institutional, government, utility, commercial, residential, IT, mission critical and OEM markets.

PowerChain™ Management helps enterprises achieve a competitive advantage through proactive management of the power system as a strategic, integrated asset throughout its lifecycle. With Eaton's distribution, generation and power quality equipment: full scale engineering services and information management systems, the power system is positioned to deliver powerful results; greater reliability, operating cost efficiencies, effective use of capital, enhanced safety and risk mitigation. That's the value of PowerChain™ Management.





Capitole 20 assembly.

## Reliable, safe and standardised design

The markets that are served by the Capitole 20 System (e.g. offices, shops, hospitals, hotels, schools etc.) require a system that is not only meeting the markets technical requirements but also require a system that can be delivered with a short delivery time.

Capitole 20 is a reliable Low Voltage distribution system that is in accordance with the IEC 60439. It is a KEMA certified Type Tested Assembly.

Capitole 20 is a safe system. Functional incoming and outgoing units have an optimum internal separation : Form 4 in accordance with IEC 60439-1, EN 60439-1 and BS EN 60439-1 and outgoing units are connected to the vertical busbar using plug-in contacts.

Capitole 20 is a highly standardised system supported by quick configuration/quoting facilities and fast deliveries.

## Characteristics



### Reliability by design

Capitole is a KEMA certified Type Tested Assembly, however, test certification is only the start of how we ensure delivery of a highly reliable product customised to your

requirements. The Capitole range of products is also included in the KEMA-KEUR product-marking scheme.



The KEMA-KEUR scheme extends beyond product certification, which confirms design viability and performance into the manufacturing of the product. Type testing is normally only carried out once in the life of a given design. KEMA continually monitor the build quality and compliance of the certified design throughout the product life for all KEMA-KEUR products.



Quality assured is common with all Eaton products, Capitole 20 is manufactured with the ISO9001 accredited facilities.



### Safety first

The safety of installers, users and maintainers of the product was considered first for our design team. As a result Capitole 20 incorporates not only excellent device

segregation using only rigid metal or insulation materials, but also door-interlocked operating handles, locked doors and screw-fixed cover plates.

### Safe to use, easy to maintain

Modules within Capitole 20 are plug-in to 1000 A rating, and all ACB modules may be selected as either fixed or withdrawable. Maintenance is therefore made both safe and easy.



### Functional flexible

Capitole 20 has been developed specifically to meet the energy distribution needs of the complete spectrum of applications including:

- Offices
- Shops
- Schools
- Hospitals
- Industry
- Hotels
- Leisure facilities
- Continuous production lines





### Wide choice of modules

As manufacturers of the complete spectrum of distribution and control devices Eaton are able to offer a comprehensive choice of modules within the Capitole program to

satisfy all project needs including:

- Air Circuit Breakers
- Moulded Case Circuit Breakers
- Fused switches
- Switch disconnectors
- Power factor correction

The use of standard devices in a modular design ensures that Capitole is ideally suited for energy distribution applications where the appropriate balance between size, electrical capacity, and cost is of particular importance.



### High density Device Mounting

The high density device mounting arrangement of outgoing functional units has been developed to minimise switchboard size whilst maintaining both excellent cabling

access and flexibility. For ratings of up to 250 A each plug-in module accommodates two MCCBs whilst for ratings of 300 A to 1000 A each plug-in module accommodates one MCCB.



### On site configurable

Capitole assemblies are designed in a way that the size and rating of functional units may be changed on-site very quickly.

Thus the assembly may be changed to reflect changing load requirements.



### Quick costing and Size

The modular design of Capitole is ideal for use with the Eaton software package; Bid Manager, which enables us to provide both price and size data in a matter of

minutes for most assemblies.



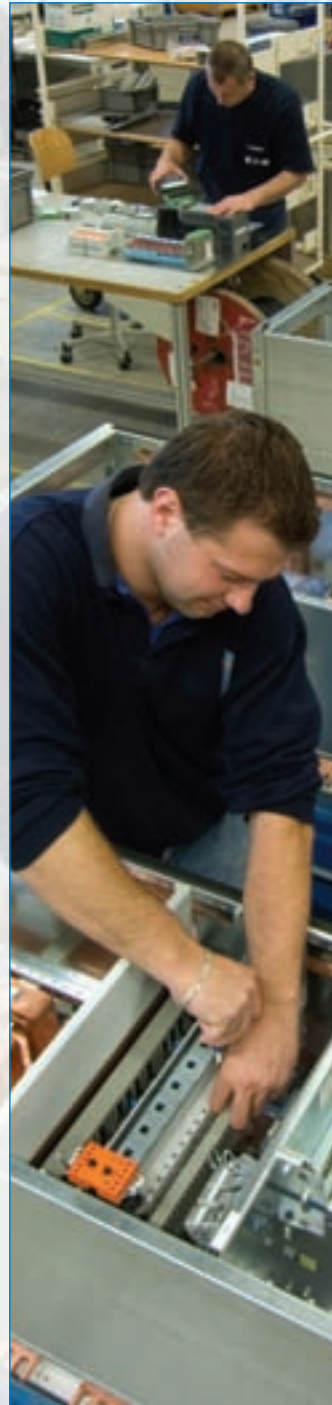
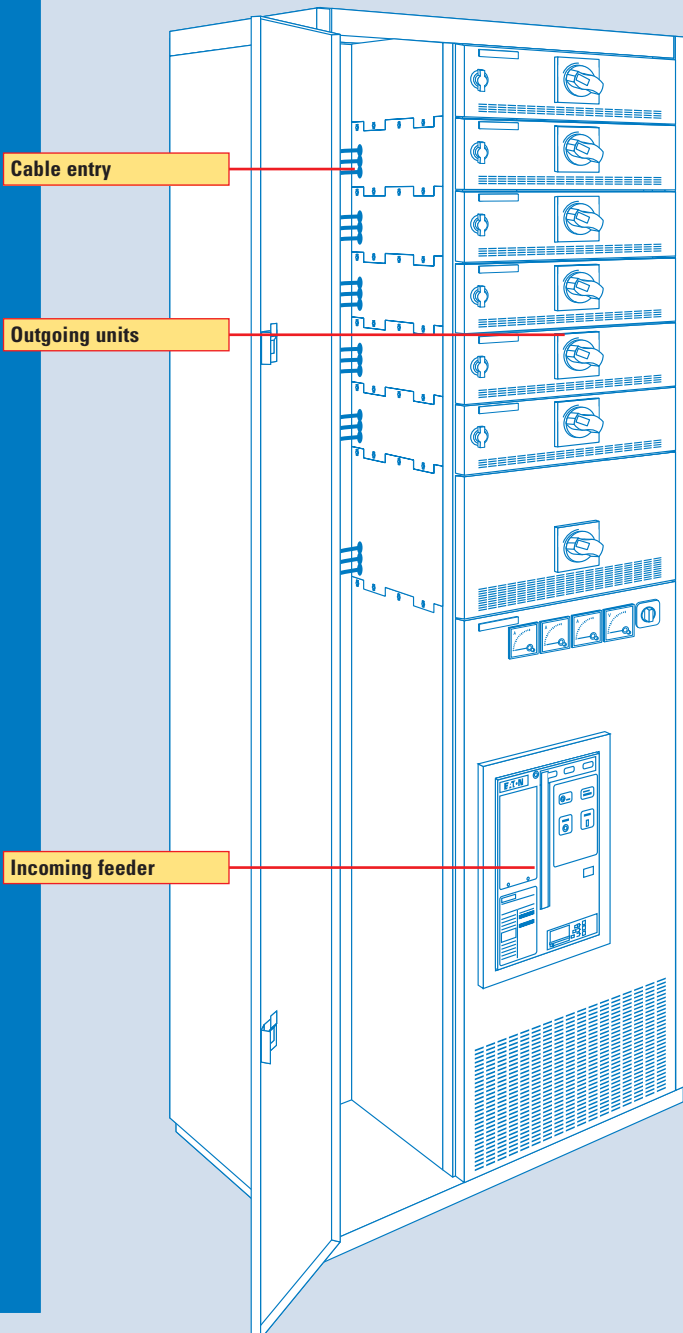
### Fast deliveries

The modular design of Capitole 20 and the optimised front-end and production processes enable us to provide Capitole 20 systems within only a couple of weeks. We

are continuously improving our delivery capabilities!

## Capitole 20

Capitole 20 cubicles are of a self supporting structure, consisting of profiles and sheet-steel side walls. The outer side-walls and front covers are epoxy-coated. Corrosion-resistant zinc coated sheet-steel plates are used for the rear and inner walls and for compartment separation.



## Cubicle arrangement

All cubicles are of modular design, comprising of top-mounted busbars enclosed within their own compartment and a switchgear or controlgear compartment. The vertical distribution busbars are accommodated in a glass-fibre reinforced polyester busbar duct with an adjacent, separate compartment for cable-entry to the withdrawable switchgear or controlgear compartments.

### Forms of internal separation

The IEC 60439-1 defines forms of internal separation. The form of separation determines how busbars, functional units and terminals are separated from each other. The BS EN 60439-1 contains Normative Annex NA "Guide to the internal separation of assemblies".



### Internal separation according IEC 60439-1

	Form 1	Form 2b	Form 3a	Form 3b	Form 4a
Busbars (main + distribution) are separated from functional units					
Functional units are separated from other functional units		✓	✓	✓	✓
Terminals are external to functional units			✓	✓	
Terminations to functional units are separated from each other			✓		✓
Terminals are separated from the busbars		✓		✓	✓
Capitole 20 supported forms of separation					✓

### Internal separation according BSEN 60439-1

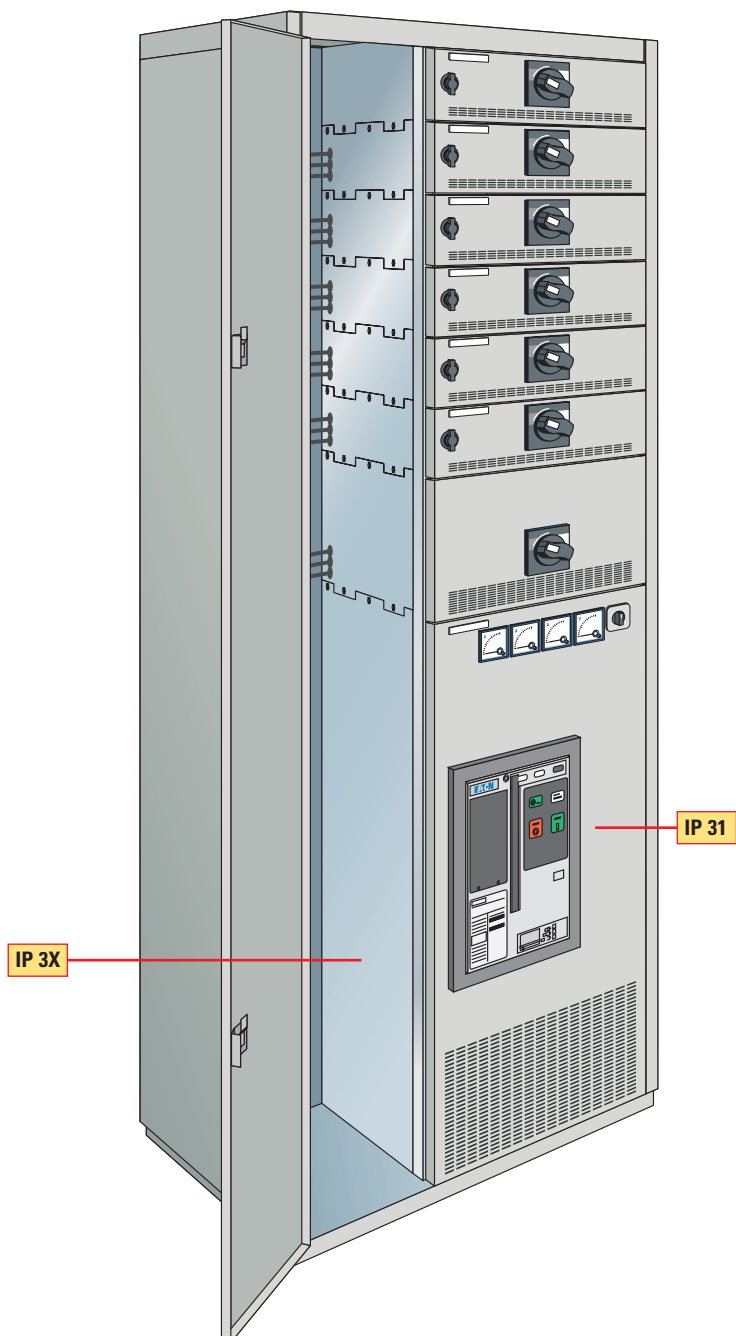
	Form 4a type 2	Form 4a type 3	Form 4b type 6	Form 4b type 7
Busbars (main + distribution) are separated from functional units by metallic or non metallic rigid barriers/partitions				
Functional units are separated from other functional units	✓	✓	✓	✓
Terminals are external to functional units			✓	✓
Cables may be glanded elsewhere, e.g. in a common cabling chamber	✓		✓	
Termination of each functional unit has its own glanding facility		✓		✓
Capitole 20 supported forms of separation	✓			
Capitole 20 High Density supported forms of separation			✓	



## Degree of protection (in accordance with IEC 60529)

Capitole 20 enclosures have a degree of protection of IP31. Partitioning between live parts in adjacent compartments complies with the following degrees of protection:

- Between main busbar compartment and any other compartments: IP2X
- Between switchgear and cable-entry compartment: IPXXB
- Between mutual compartments of each functional unit within a cubicle: IPXXB
- Within opened switchgear compartment: IPXXB (QSA in off position: primary and secondary fuse connections are voltage free)
- Within switchgear compartment with removed plug-in units : IPXXB





## Main busbar system

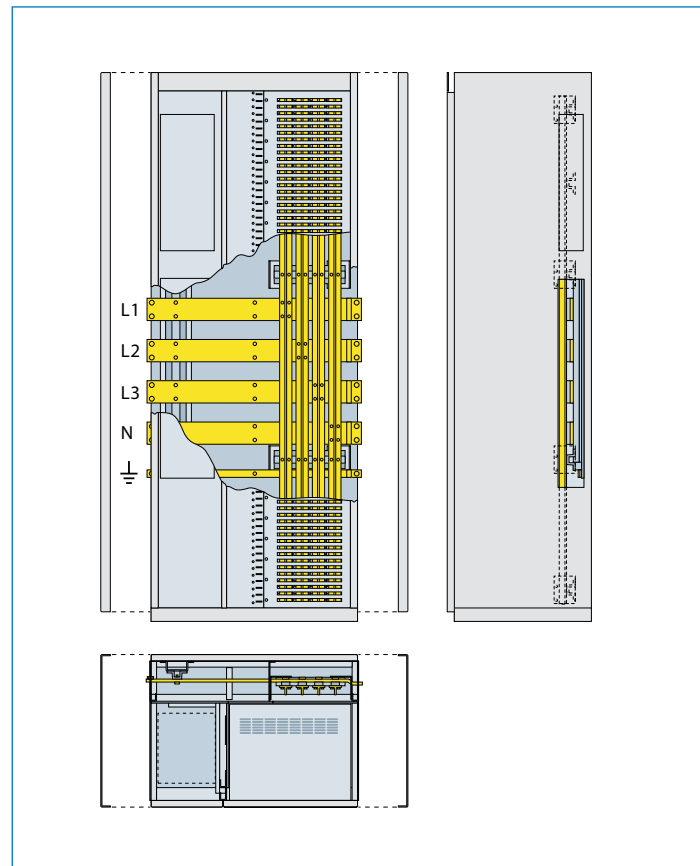
### Main busbar system

The main busbar system is located in a separate busbar compartment in the mid rear of the panel. The compartment has an IP4X degree of protection with respect to the cable compartment and has an IPXXB degree of protection with respect to the functional unit compartment.

The main busbar is sectioned per panel and has coupling facilities. It can be provided for systems with combined or separated neutral/protective earthing.

### Ratings and cross-sections of main busbars

$I_n$ (rated current)	Cross-section (Cu)	$I_{cw}$
1200 A	35 x 10 mm	35/50 kA-1 s
1900 A	80 x 10 mm	50 kA-1 s
2350 A	80 x 15 mm	50 kA-1s
3200 A	2 x 100 x 10 mm	63 kA-1s



Main busbar arrangement



### Incoming feeders and buscouplers

Incoming feeders are available with:

- Switch disconnector, make; Eaton Dumeco (fixed) or Eaton QP (plug-in)
- Air Circuit Breaker, make; Eaton Magnum<sup>1)</sup> (fixed or withdrawable)
- Fused Switch disconnector, make; Eaton QSA (plug-in)
- Moulded Case Circuit Breaker, make; Eaton Series G J- /L- /N- frame (plug-in)

Buscouplers are available with:

- Switch disconnector, make; Eaton Dumeco (fixed) or Eaton QP (plug-in)
- Air Circuit Breaker, make; Eaton Magnum<sup>1)</sup> (fixed or withdrawable)
- Fused Switch disconnector, make; Eaton QSA (plug-in)
- Moulded Case Circuit Breaker, make; Eaton Series G J- /L- /N- frame (plug-in)

Combination of 1 incoming feeder (Switch disconnector or ACB) and 1 Buscoupler (Switch disconnector or ACB) in 1 panel is offering a very compact solution. For twin ACBs the maximum incomer rating is 2000 A coupled to a 1600 A buscoupler.

<sup>1)</sup> Magnum Air Circuit Breakers range from 800 A up to 3200 A. For detailed information ask for Magnum brochure.

## Distribution busbar system

Dependent on the application, the vertical distribution busbars in type KT2.4 panles run over total or over half cubicle height. The busbars are screened (IP20) by means of an insulated shield. The shields have a slotted pattern for access to the plug-in main isolating contacts which connect the MCCB units to the vertical busbars. At mid-height of the cubicle, the distribution busbars are fed by the main busbars, allowing a current consumption of max. 2500 A per cubicle.



Moulded case circuit breaker

**The vertical distribution busbar system is available for the following rated currents and cross-sections:**

$I_n$ (rated current)	$I_{CW}$
2 x 1150 A	35/50 kA-1 s
2 x 1250 A	50 kA-1 s

(2 x 1250 A is a centre-fed 2500A)

### Outgoing units

Outgoing units are available with:

- Switch disconnecter, make; Eaton Dumeco (fixed) or Eaton QP (plug-in)
- Air Circuit Breaker, make; Eaton Magnum (fixed or withdrawable)
- Fused Switch disconnecter, make; Eaton QSA (plug-in)
- Moulded Case Circuit Breaker, make; Eaton Series G E- /J- /L- /N- frame (plug-in)

### Outgoing plug-in units

The plug-in units are provided with plug-in contacts connecting the unit to the distribution busbars. Each plug-in unit with a rotary handle has an automatic door interlock. This interlock prevents the door being opened when the switch or MCCB is in the ON position. Plug-in unit doors with toggle handles can only be opened using a special tool.

## Plug-in contacts

The incoming/outgoing units of the plug-in type are connected to the vertical distribution busbar using special plug-in contacts.

Two types of plug-in contacts ( $I_{CW} = 50 \text{ kA-1s}$ ) are used:  $I_n$  160 A and  $I_n$  400 A. These are used in single or multiple configurations to facilitate ratings of up to 1250 A.



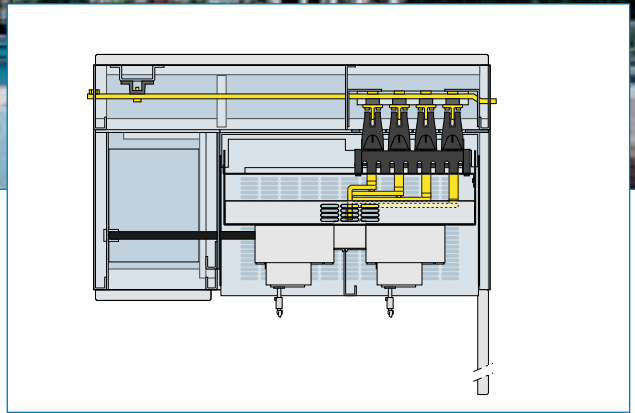
Detailed plug-in contact



Both the contacts of the plug-in contacts and the distribution busbars are silverplated for optimal electrical connection.

### Benefits of plug-in contacts

- Easy to assemble a plug-in unit
- Easy to insert a plug-in unit
- Easy to withdraw a plug-in unit
- Reliable, the higher the current the better the contact pressure and the better the electrical contact
- Flexible, the universal flexible adapter enables support of several kinds of devices



Topview High Density module

### High Density

Capitole High Density modules have been specifically developed to meet the distribution needs of modern installations. Whilst maximising stacking density to minimise the switchboard footprint they do not compromise on the essential requirement for excellent cabling space. High Density units feature:

- Disconnectable (plug-in) modules
- Twin (two devices side-by-side) modules for devices up to 250 A rating
- Single (one device) modules up to 1000 A rating
- Up to 24 devices per column in twin module format
- Up to 16 devices per column in single module format
- Choice of Form 4a Type 2 or Form 4b Type 6 separation
- Choice of toggle or door interlocked rotary handle operated MCCBs
- Optional metering facility
- Rotary handle devices may be key interlocked using Castell or Fortress locks
- MCCBs in single modules may be motor operated



Toggle operated MCCBs



Rotary handle operated MCCBs and fused switches

### Cable connection

The outgoing cables are directly connected on the device (QSA or MCCB) in the functional unit compartment. The functional unit is separated from the cable compartment using a separation plate (IP3X). This plate is easy to install and remove.

Capitole 20 offers a choice of 250 mm, 375 mm and 500 mm cable way widths.



Maximum number of MCCB feeder units (3 or 4 pole with rotary handle) per panel						
MCCB rating (A)	63	160	250	400	630	1000
Cap20 standard	10	10	10	7	7*	**
Cap20 High density	24	20	20	7	5	4

Maximum number of FCS feeder units (DIN fuse and FCS with rotary handle) per panel						
FCS rating (A)	63	160	250	400	630	950***
Cap20 standard	15	15	9	9****	4	2

Maximum number of FCS feeder units (BS fuse and FCS with rotary handle) per panel						
FCS rating (A)	63	160	250	400	630	800
Cap20 standard	12	10	9	9****	3	3

\* 480 A rated current  
 \*\* Not available  
 \*\*\* Switch + fuse in line  
 \*\*\*\* 355 A



## Fields of application

- Offices
- Shops
- Schools
- Hospitals
- Hotels
- Industry
- Leisure facilities
- Continuous production lines
- Water treatment and management
- Petrochemical manufacturing
- Pharmaceutical manufacturing



### Options

- Integrated PLC-controlled synchronization and changeover equipment (Otonet)
- Outgoing units can be provided with measuring instruments (analogue or digital)
- Subdistribution can be included with fuses or MCCBs
- Special locking facilities
- Separate foundation frame (100 mm)
- BS fuses
- 100% rated neutral
- Vertical busbar phase-to-phase screening plates
- Mimic diagram
- Corner cubicle
- Back to back arrangement
- Power factor correction
- IP2x screening with open doors
- Electricity Board Metering
- Cover on top of panel for external ACB connections
- Wider cable compartments (375 or 500 mm)



Otonet



Outgoing unit with digital measurement



Outgoing unit with analogue measurement



Corner cubicle



Special locking facilities



Subdistribution

## Capitole 20 Fast Track



Eaton's Capitole 20 Fast Track program offers the ideal solution for projects with a short lead-time. Within three weeks after receipt of the order your Fast Track Capitole 20 system will be leaving our production facility.

### Speed & reliability

Fast Track offers not only speed. The Fast Track concept also delivers a very reliable system. Every Capitole 20 Fast Track system is a Type Tested Assembly (TTA) and has the KEMA-KEUR label. The Capitole 20 Fast Track system provides optimum quality and safety for your operating personal.

### The concept

The Fast Track concept is created from an extensive low voltage system knowledge and is based on a standard set of modules using quality components and a refined logistic system. The result of the standard set of Fast Track modules is that no customer specific engineering is required.

## The Fast Track to a reliable energy supply



The Fast Track concept starts with a Fast Track quote. Modern quoting tools enable us to submit not only a price within 24 hours but also deliver a system specification and system drawing.

The total order process is optimized, enabling us to deliver the high quality Fast Track system Ex Works within three weeks after receiving your order.

### The specifications

The efficient use of a large set of standard modules enables us to cover many customer needs. A Fast Track system meets the following specifications:

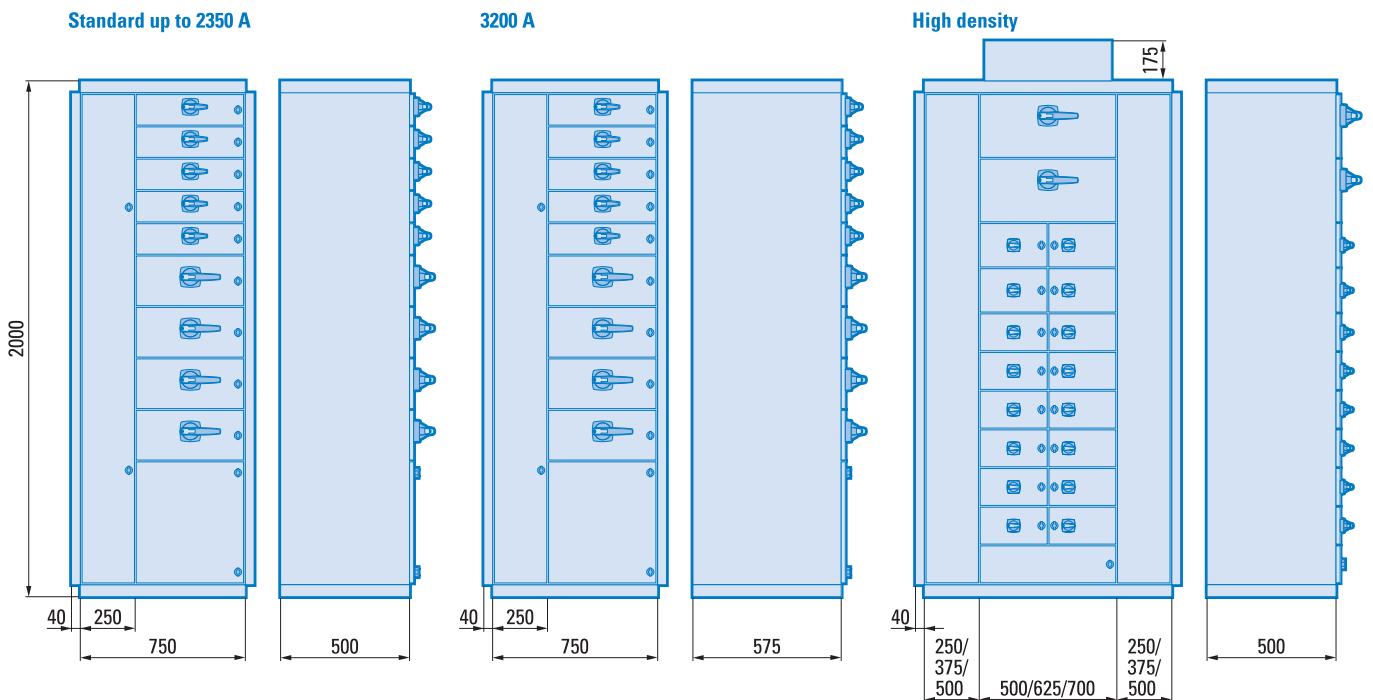
- The system is limited to a maximum of 4 panels
- The incomers, Circuit Breakers or Switches are rated up to 2350 A
- The main busbar system is rated up to 2350 A and 50 kA 1sec.
- Feeders are plug-in type, with Circuit Breakers or fused switches are rated up to 630 A
- The degree of protection is IP 31
- The form of separation is Form 4a (type 2)
- It is front access
- The panel color is RAL 7035

### At your service

The Capitole 20 Fast Track Team are experienced specialists. They will assist you in defining the Fast Track system that is suitable in meeting your specific requirements. For contact details see the back page of this brochure.

## Technical data

Capitole 20	
<b>Electrical data</b>	
Rated operational voltage	690 V
Rated frequency	50/60 Hz
<b>Main busbar data</b>	
Rated insulation voltage	1000 V
Rated impulse withstand voltage	12 kV
Rated current	3200 A
Rated short-time withstand current	50 kA and 65 kA 1s
Rated peak withstand current	110 kA
<b>Vertical distribution busbar data</b>	
Rated insulation voltage	1000 V
Rated impulse withstand voltage	12 kV
Rated current	2 x 1250 A (centre fed)
Rated short-time withstand current	50 kA 1s
Rated peak withstand current	110 kA
<b>Outgoing units</b>	plug-in
<b>Enclosure data</b>	
Degree of protection	IP31
Form of separation	Form 4a Type 2, Form 4b Type 6
Entry of cables	Top and/or bottom
Access	Front
Standard Colour	RAL 7035
<b>Standards</b>	IEC 60439-1, BS EN 60439-1
<b>Certifications</b>	KEMA-KEUR



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Eaton Corporation is a diversified industrial manufacturer with 2006 sales of \$12.4 billion. Eaton is a global leader in electrical systems and components for power quality, distribution and control; fluid power systems and services for industrial, mobile and aircraft equipment; intelligent truck drivetrain systems for safety and fuel economy; and automotive engine air management systems, powertrain solutions and specialty controls for performance, fuel economy and safety. Eaton has 62,000 employees and sells products to customers in more than 125 countries. For more information, visit [www.eaton.com](http://www.eaton.com).

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