Switchgear & Controlgear Systems

logstrup

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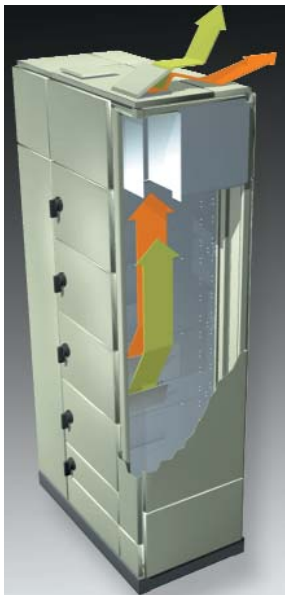
Logstrup - Safety & Reliability

Logstrup is an international organisation engaged in the manufacture and supply of switchgear and controlgear systems worldwide. Since 1958 the company has been a leading innovative force in this industry.

Logstrup has developed a complete range of type tested switchgear and controlgear systems. These systems cover the whole spectrum of low voltage applications from the main switchboard down to the smallest distribution board and process panel.

The emphasis throughout the organisation is on quality and safety. Products have been rigorously tested by independent test laboratories to ensure compliance to IEC 60439-1-1999-09, EN 60349-1 1994, BS EN 60439-1 1994 and other international standards.

This, together with worldwide acceptance by relevant local electrical inspectorates provides the most comprehensive package available.



Product safety alone is not enough in today's society. Personal safety is of prime importance. This is an area in which Logstrup excels and continues to invest heavily in the design of equipment to ensure that there is minimum possibility for injury during normal installation and service. Logstrup takes pride in the fact that all products and designs are reliable, well proven and fit for purpose.

Great effort has been involved in the creation of an enclosure system which minimises the possibility of an arc occurring and also limits the effect of accidental arcs. This is accomplished by containment within the enclosure and allowing the safe release of the resulting over-pressure and gases.

This is an option which must be specified when ordering.

Switchgear & Controlgear Systems

Logstrup provides a total low voltage electrical equipment package to cover all applications. Because of the unique design and adaptability of the product all of the following solutions can easily be supplied and even integrated into the same enclosure.

- Busbar Trunking Systems
- Packaged Substations
- Main Switchboards
- Distribution Boards
- Power Factor Correction Cubicles
- Motor Control Centre (Fixed and Withdrawable)
- Process Control Panels
- 19” Rack Systems
- Service Ducting
- RFI / EMP Shielded Cabinets
- Consoles and Control Desks
- Customised Enclosures
- Dust and Noise Protection Enclosures

The use of one product range reduces cost, maintains a high level of safety and quality and ensures a uniform design throughout the plant.

The Logstrup system is thoroughly type tested according to specifications and requirements in IEC 60439-1-1999-09 for Type Tested Switchgear Assemblies (TTA). It conforms to all the regulations of major markets in Europe, Asia, Australia, and America.

The standard paint finish and internal components can withstand most climatic variations.

The following tests have been successfully carried out at independent test laboratories by ASTA, KEMA, ACAE and IPH.

- Short Circuit Test
- Temperature Rise Test
- Earth Continuity Test
- Arc Test (Pehla)
- Vibration Test
- Dielectric Test
- Degree of Protection (IP)
- Bump Test

The standard system has obtained type approvals from the major Ship Classification Societies, CSA and UL.

Industry Wide Applications

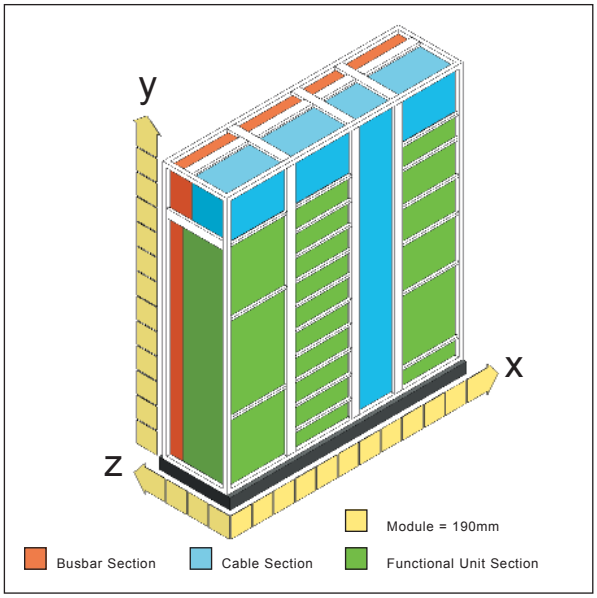
Having to choose different products for various applications requires a lot of extra effort in studying the technical specifications of each product and keeping up to date on all. Choosing one product to cover all applications increases efficiency and maintains the highest standards throughout.

Logstrup has supplied switchboards and motor controlgear to all industrial applications including the following:-

- Chemical
- Pharmaceutical
- Mining
- Power Stations
- Process Engineering
- Marine/Offshore
- Military
- Petrochemical
- Building Services

The stainless steel range is particularly suited to harsh environments such as dairying, brewing and chemical manufacturing.

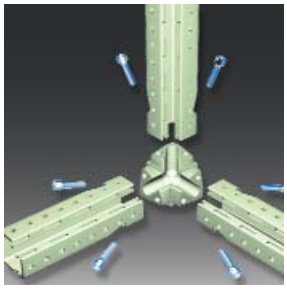
Customised enclosures to IP65, in painted and stainless steel, are also available.

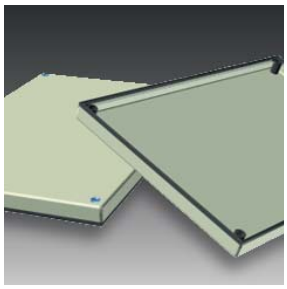


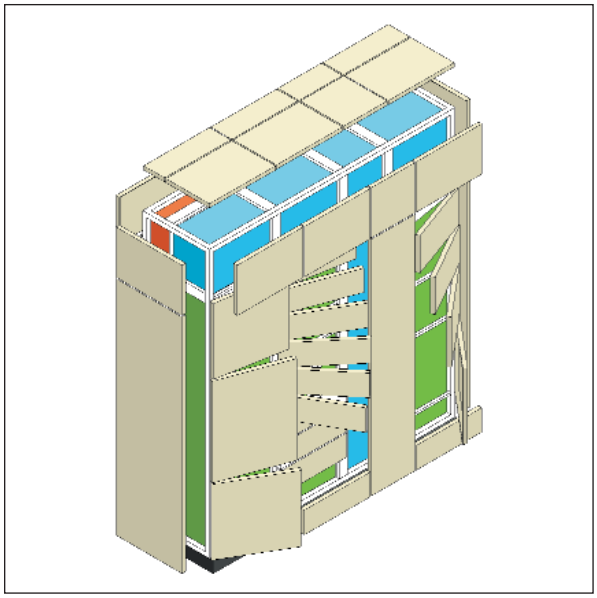
The Logstrup enclosure system has complete modularity in all 3 axes with a base module of 190mm. This provides the most flexible solution possible. Width, height and depth as well as sizing and placement of any sub-sections are infinitely variable. Many space restrictions can be overcome by making angled or back to back arrangements.

Since all components are standard stock items, design changes or other modifications can easily be catered for during the assembly phase or onsite.

Enclosure Construction



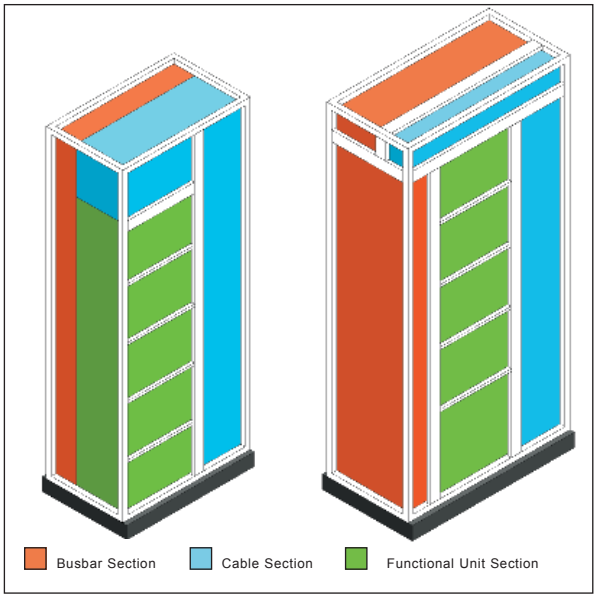




The unique corner joint and framework system constructed of 2mm steel profiles, incorporating 5 bends ensures a maximum strength. This makes the system particularly suited for heavy duty equipment, large busbar systems and demanding operating conditions.

External cladding and doors all come with a sealing gasket ensuring a standard IP44 rating (IP54 obtainable).

All cladding can be delivered in 1.5mm or 2.0mm steel as standard. The complete range is also available in stainless steel.

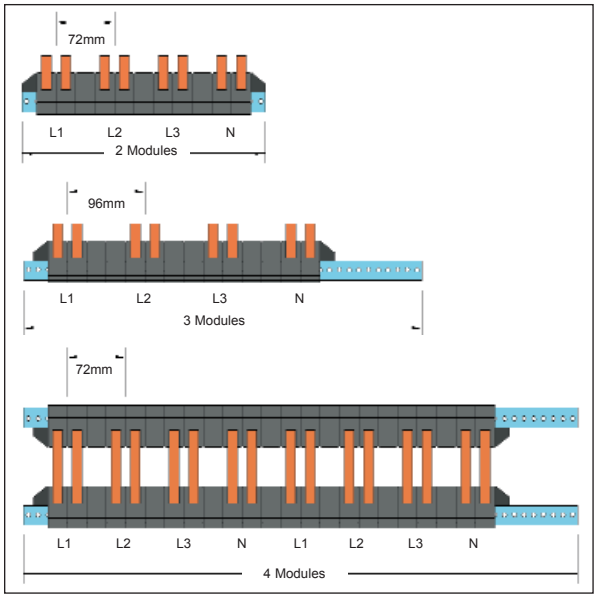


The busbar system forms the main power distribution within an assembly and is one of the critical elements determining the assembly's operational reliability and safety. The Logstrup busbar system is designed to withstand the mechanical and thermal stress existing during normal service as well as under fault conditions.

The main busbar can be arranged at the top, bottom or at any module in between in the enclosure. They may also be arranged in the X,Y plane or in the Z plane. This allows the ultimate in flexibility.

The distribution busbars can be placed behind the functional units or between them, allowing for rear access.

Busbar Section



The system consists of modular components which allow unlimited variations. 3, 4, & 5 wire systems can be created with ease, while the space between phases can be increased to ease connection to large breakers and facilitate connections of multiple cables.

The busbar support insulators are manufactured from a high grade polymer, which can withstand all the mechanical and thermal stresses involved. All polymers used in the system are CFC and halogen free.

Systems up to 8000A can be assembled as standard. A 2 bar, 2x2 bar or 3x2 bar per phase arrangement is used. This allows connections and extensions to be made without drilling or bending of the copper.

For busbars over 3000A, the modularity of the Logstrup system makes it possible to reduce the electromagnetic effect by use of stainless steel parts. This is a recommended design guideline.

The high short circuit level of the busbar system and the mechanical robustness of the enclosures, guarantees a reliable, safe and long lasting system suitable for even the most demanding environments.

Functional Unit Section

Functional units are classified by their level of compartmentation and type of electrical connection. An extensive range of standard parts offers complete freedom in design:

- Internal separation from Form 1 to Form 4B
- Fixed units (FFF)
- Removable units (WFD)
- Withdrawable units (WWW)

Different types of functional units can be mixed within the same assembly or section, in order to efficiently meet requirements regarding continuity of supply, service conditions or budgetary constraints.

Due to the complete modularity of the system, the physical dimensions of the functional units can be varied in all 3 axes. This allows complete optimisation of design with respect to the overall dimensions of the assembly, heat dissipation, service and maintenance.

Electrical equipment from all manufacturers may be fitted in accordance with the customers' preferences.

To secure the overall safety level of the assembly all components are manufactured from steel or high grade polymer to resist the spread of fire.

Economising on space in a switchboard or motor control centre can be detrimental for the personnel involved in the installation of the equipment. The provision of narrow cableways leads to higher installation costs, dangerous working conditions and may inadvertently lead to bad workmanship due to lack of proper space. The long term consequences may be higher service time and more downtime.

In designing a Logstrup type tested assembly, various widths of cableways may be incorporated depending on the number of cables and their respective size.

Standard widths are 450mm,640mm and 830mm. This is especially important where large cables have to be installed or a cableway is shared with 2 functional unit sections.

A cableway can run horizontally throughout the whole length of the board, at the top and bottom as well as vertically beside each functional unit section. This provides a complete island around each functional unit section and allows inter-wiring between various units and back to PLC sections with ease.

Switchboards / Distribution Boards

Logstrup offers the complete range from packaged sub-stations to main / sub-distribution boards with nominal ratings from 250A up to 8000A. Incoming feeder sections and bus-coupler arrangements are available for rated currents up to 6300A. Power factor correction equipment, if required, can be built into the switchboard. Bus duct arrangement to transformers or between panel sections can be made in the Logstrup enclosure and busbar system. This ensures complete integration and provides a professional uniform design throughout the switchroom.

Full freedom of choice is offered in the selection of electrical equipment with regard to type and manufacturer of breakers for fixed, removable and withdrawable versions.

Segregation level up to Form 4B is available as a standard.

The complete modularity of the Logstrup system allows maximum freedom when designing Motor Control Centres. The physical dimensions of each compartment can be varied in width, height and depth to accommodate the various space requirements for different starter types:

- Direct on Line
- Star Delta
- Soft Start
- Autotransformer Starters
- Variable Speed Drives

Motor Controlgear (Fixed and Withdrawable)

In order to meet the high demand for uninterrupted power supply in industries with complex manufacturing technologies or critical services, motor control centres can be made in fixed, removable, fully withdrawable or any combination thereof.

The system will also allow the design of intelligent motor control centres which integrate electronic and programmable devices connected to a network such as DeviceNet and ProfiBus together with traditional electromechanical equipment.

Process Panels, Electronic Racking, Sheilding, Machine Cover and Noise Protection

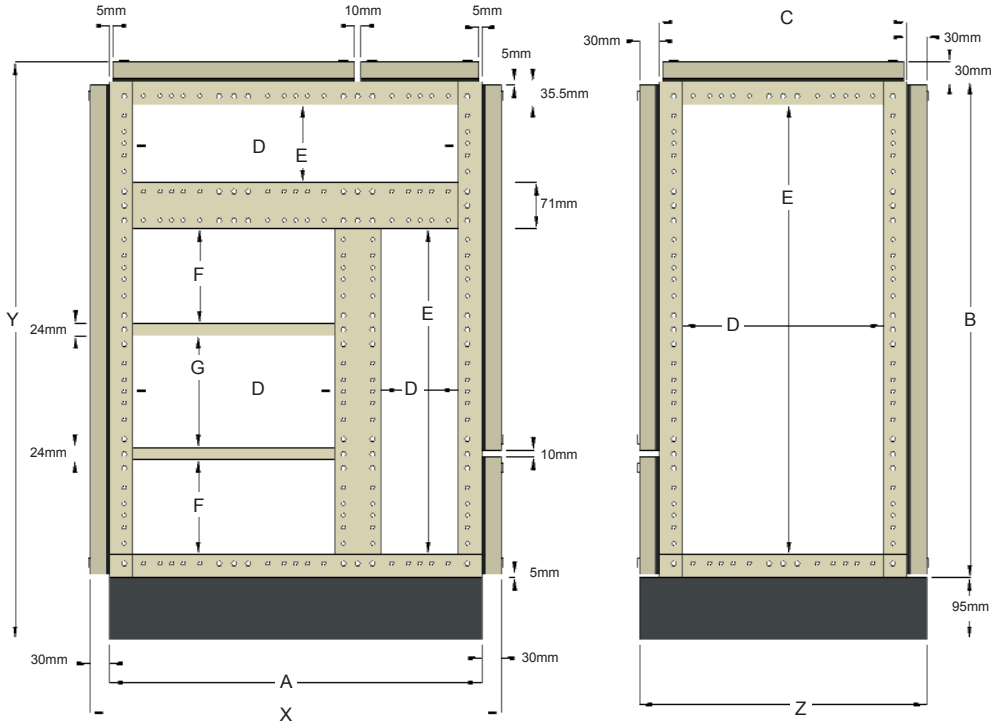
Most manufacturing and building services today require some degree of automatic monitoring and control. Complete process panels, utilising the latest technology in PLC control and recording, may be supplied along with console units and heavy duty electronic racking. Large computer systems require extensive networks. The associated cabling is facilitated through the use of patch panels.

All electrical equipment emits electro-magnetic pulses (EMP) and are also susceptible to radio frequency interference (RFI) due to the increasing use of low voltage low current applications. To solve this problem all electrical equipment may be built in specially shielded panels.

A busbar and service trunking system can be constructed, providing a range of services such as electrical, air, vacuum, water and chemicals to a number of machines.

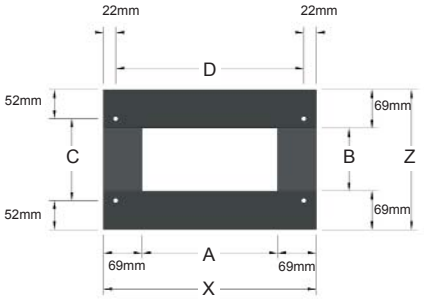
Technical Specification & Standards

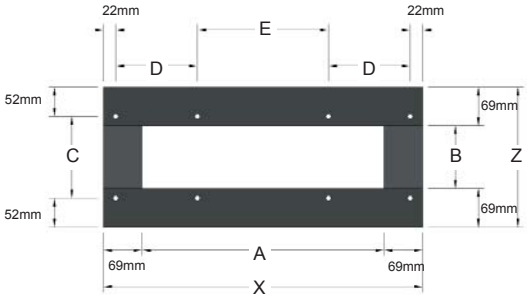
Standards	IEC 60439-1-1999-09	
	DIN EN 60439 Teil 1 (VDE 0660 Teil 500) 2000	
	BS EN 60439-1-1999-08	
	CSA - C22.2 No 31 & 14	
	DIN 43671/12.75	
	Pehla Richtlinie 4 1984	
	IEC 529	
	Ship Classification Societies	
Tests	IPH (Berlin, Germany)	
	ASTA (Rugby, England)	
	KEMA (Arnhem, Holland)	
	CSA (Rexdale, Canada)	(approval)
	Underwriters Laboratory (Melville, USA)	(approval)
	DEMKO (Denmark)	
	Elektronikcentralen (Denmark)	
	Germanisher Lloyd	(approval)
	Lloyd's Register of Shipping	(approval)
	Det Norske Veritas	(approval)
	The Russian Maritime Register of Shipping	(approval)
	Bureau Veritas	(approval)
Electrical Characteristics	Rated voltage (U_e)	690 V. AC
	Rated insulation voltage (U_i)	1000 V
	Dielectric test voltage	3 kV
	Rated impulse withstand voltage (U_{imp})	12 kV
	Rated frequency	40-60 Hz
	Rated current (I_n)	250A - 8500A
	Rated short-time withstand current (I_{cw})	Up to 130 kA 1 sec.
	Rated peak withstand current (I_{pk})	Up to 300 kA
Mechanical Characteristics	Degree of protection, IEC 529	Up to IP 54
	Corners	Aluminium alloy
	Framework steel (Aluzinc or painted)	2.0 mm
	Base frame steel (Painted)	2.5mm Dogal 350 YP
	Doors & plates steel (Painted)	1.5 or 2.0 mm
	Mounting plates steel (Aluzinc)	1.5 mm
	Internal partitions steel (Aluzinc)	1.0 mm
	Internal separation	Form 1 - 4
	Stainless steel	ANSI 304 160/80

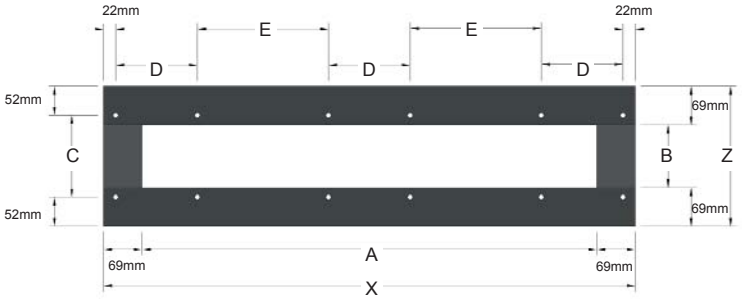


Module	A mm	B mm	C mm	D mm	E mm	F mm	G mm	X mm	Y mm	Z mm
1	190	190	190	119	119	142.5	166	250	315	250
2	380	380	380	309	309	332.5	356	440	505	440
3	570	570	570	499	499	522.5	546	630	695	630
4	760	760	760	689	689	712.5	736	820	885	820
5	950	950	950	879	879	902.5	926	1010	1075	1010
6	1140	1140	1140	1069	1069	1092.5	1116	1200	1265	1200
7	1330	1330	1330	1259	1259	1282.5	1306	1390	1455	1390
8	1520	1520	1520	1449	1449	1472.5	1496	1580	1645	1580
9	1710	1710	1710	1639	1639	1662.5	1686	1770	1835	1770
10	1900	1900	1900	1829	1829	1852.5	1876	1960	2025	1960
11	2090	2090	2090	2019	2019	2042.5		2150	2215	2150
12	2280	2280	2280	2209	2209			2340	2405	2340

Base Frame Fixing Points







Module X, Z	X mm	Z mm	A mm	B mm	C mm	D mm	E mm	G mm
1	-	250	-	112	146	-	-	-
2	380	440	242	302	336	336	-	-
3	570	630	432	492	526	146	234	-
4	760	820	622	682	716	336	44	-
5	950	1010	812	872	906	146	146	234
6	1140	-	1002	-	-	336	336	44
7	1330	-	1192	-	-	380	234	146
8	1520	-	1382	-	-	380	44	336
9	1710	-	1572	-	-	380	146	380
10	1900	-	1762	-	-	380	336	380
11	2090	-	1952	-	-	380	526	380
12	2280	-	2142	-	-	380	716	380

Rating table for copper busbars according to DIN 43671
(Cu. quality: F 25 HH acc. to DIN 1787, and Edge radius 0.4mm acc. to DIN 1759/1761).
Rating at 40°C ambient temperature (average temperature over 24 hours : 35°C) and maximum busbar temperature 120°C.
The ratings are tested values and the tests are performed in a Form 4 type panel with a degree of protection IP 4X. Beside the tested values listed below, other ratings can also be obtained and verified by calculation, please consult Logstrup.

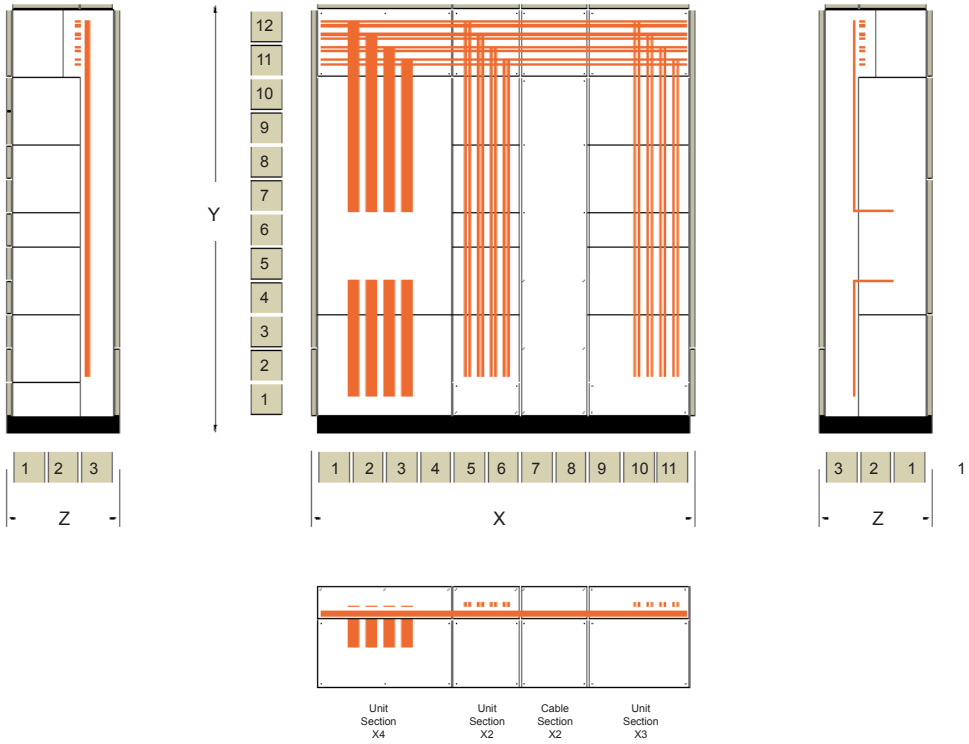
Rating Table						
Ratings [A]	Cross section [mm]	Area [mm^2]	Rated short-time withstand current [I_{cw}]	Rated peak withstand current [I_{pk}]	Distance between supports	Configuration
250	2x6x6	72	12.5/1 sec	25	380mm	Single Support
400	2x6x12	144	20/1 sec	40	380mm	Single Support
630	2x12x12	288	50/1 sec	110	380mm	Single Support
800	2x12x18	432	50/1 sec	110	380mm	Single Support
1000	2x12x24	576	50/1 sec	110	380mm	Single Support
1250	2x12x30	720	50/1 sec	110	380mm	Single Support
1600	2x12x42	1008	50/1 sec 65/1 sec	110 143	380mm **380mm**	Single Support **Single support +BSR Insert type 11015/16**
2000	2x12x66	1584	50/1 sec 100/1 sec	110 220	380mm **380mm**	Single Support **Double Support**
2500	2x12x90	2160	100/1 sec	220	**380mm**	**Double Support**
3000	2x12x114	2736	100/1 sec	220	**380mm**	**Double Support**
3800	2x12x150	3600	65/3 sec 100/1 sec	143 220	**380mm** **380mm**	**Double Support** **Double Support**
4500	2x12x90x2	4320	100/1 sec 116/0.5 sec	220 275	**380mm** **380mm**	**Double Support** **Double Support**
6300*	2x12x114x2	5472	65/3 sec 100/1 sec 107/0.5 sec	143 220 275	**380mm** **380mm** **380mm**	**Double Support** **Double Support** **Double Support**
8500	2x12x114x3	8208	130/1 sec	300	**380mm**	**Double Support**

*6300A was tested with a degree of protection of IP3x

The tables in this brochure are only to be used as a guideline. Please consult your local National Standards for more accurate information.

Dimension & Layout

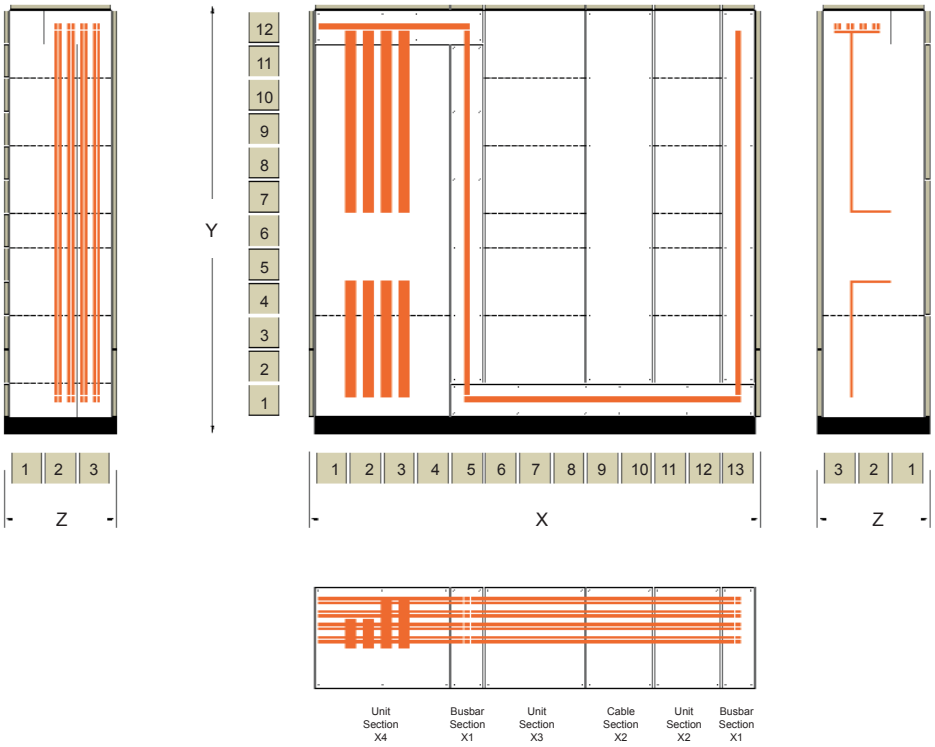
Busbar in X,Y Plane



Busbar in Z Plane

upto 1600 Amps = 1 Mod

over 1600 Amps = 2 Mods



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Section Sizes (Usable Space)									
Unit Section (Fixed)			Unit Section (Withdrawable)			Unit Section (Mini Withdrawable)			Cable Section
---	Y1=186	---	---	Y1=114	---	X1=141	Y1=158	---	---
---	$Y1^{1/2}$=281	---	---	---	---	---	---	---	---
X2=305	Y2=376	Z2=266	X2=235	Y2=304		X2=310	---	X2=450	---
X3=495	Y3=566	Z3=420	X3=425	Y3=494	Z3=190	X3=479	---	Z3=371	X3=640
X4=685	Y4=756	Z4=420	X4=615	Y4=684	Z4=382	---	---	---	X4=830

Motor Starters (Kw)								
(X,Y)	Direct on Line				Star Delta			
	Fixed Pattern		Withdrawable		Fixed Pattern		Withdrawable	
	MCCB	Sw/Fuse	MCCB	Sw/Fuse	MCCB	Sw/Fuse	MCCB	Sw/Fuse
2.1	11	11	---	---	11	---	---	---
2.2	30	30	---	---	15	15	---	---
2.3	37	37	---	---	22	22	---	---
2.4	55	55	---	---	37	37	---	---
2.5	75	75	---	---	55	55	---	---
2.6	100	100	---	---	75	75	---	---
2.7	140	140	---	---	100	100	---	---
3.1	37	22	30	22	30	7.5	15	15
3.2	55	55	55	55	55	30	55	45
3.3	110	90	90	75	90	55	90	55
3.4	200	160	160	132	120	75	110	90
3.5	300	250	---	---	---	100	---	---
3.6	---	---	---	---	---	140	---	---
3.7	---	---	---	---	---	220	---	---

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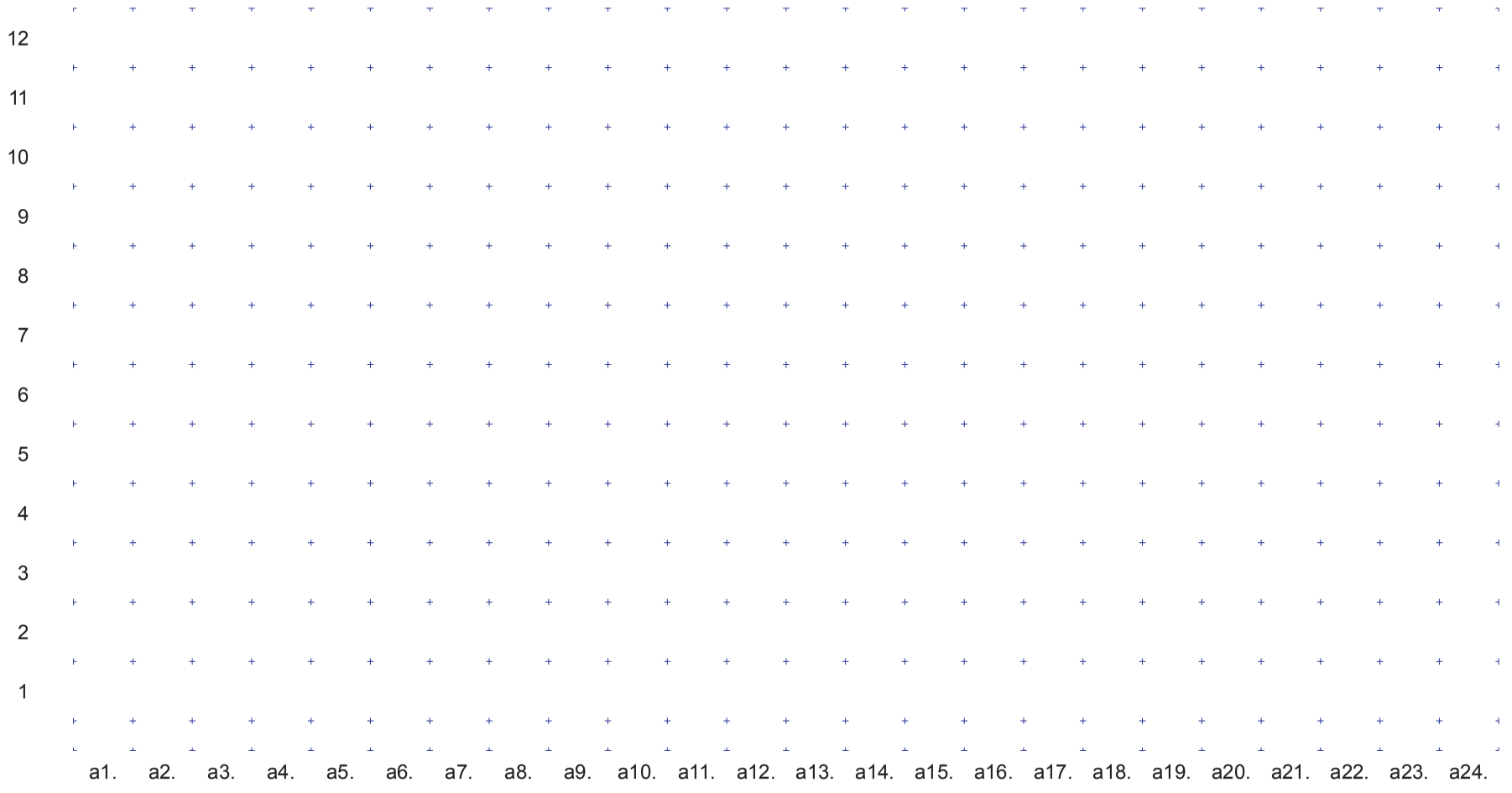
Største sikring til beskyttelse af tavlen:
Sandfyldt hurtig . . . . . .A
Sandfyldt træg . . . . . .A
Åben (luftledningssikring) . . . . . .A

Fuse quick . . . . . .A
Fuse slow . . . . . .A
Open fuse . . . . . .A



				ORDRE / KONTO NR ORDER / ACCOUNT NO					
NOT REV	ÆNDRING DESCRIPTION	DATO DATE	PROJEKT PROJECT						
INGENIØRFIRMA CONSULTING ENGINEER				AFDELING DEPARTMENT					
INSTALLATØR CUSTOMER							TILHØRENDE TEGNINGER ACCOMPANYING DRAWINGS		
TEGNER DESIGNER	DATO DATE	PROJEKT PROJECT	SKALA SCALE	SPÆNDING VOLTAGE	SPOLESPÆNDING PILOT VOLTAGE	FREKVENS FREQUENCY	JORDLEDNING PROTECTION	ELVÆRK POWER WORK	SIDE PAGE
			1 : 20						
logstrup				OPSTILLINGSSTED PLANT					TEGNING NR DRAWING NO
				TAVLEBETEGNELSE SWITCHBOARD					

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