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Technical information

LV distribution system – LV switchgear cabinet

MDmax®

LV switchgear cabinet
MDmax®

Contents

LV switchgear cabinet - MDmax®

Product overview

MDmax® LV switchgear cabinet is divided into two series: MDmax ST and MDmax FC. It is combined type multifunction LV switchgear cabinet which has passed TTA, and complies with standards GB7251.1-2005 and IEC60439-1.Electrical and mechanical design adopts module principle. Compact, diverse and flexible cabinet combination scheme is realized by selecting standard elements and standard components.

Application fields

Automobile manufacturing

Ferrous metallurgy

Papermaking and printing

Petrochemical industry

Foods and medicines

Tobacco & Wine

Data center

Power stations

Ships and offshore platforms

Municipal infrastructur

Public transit

Environmental protection treatment

Schools and hospitals *

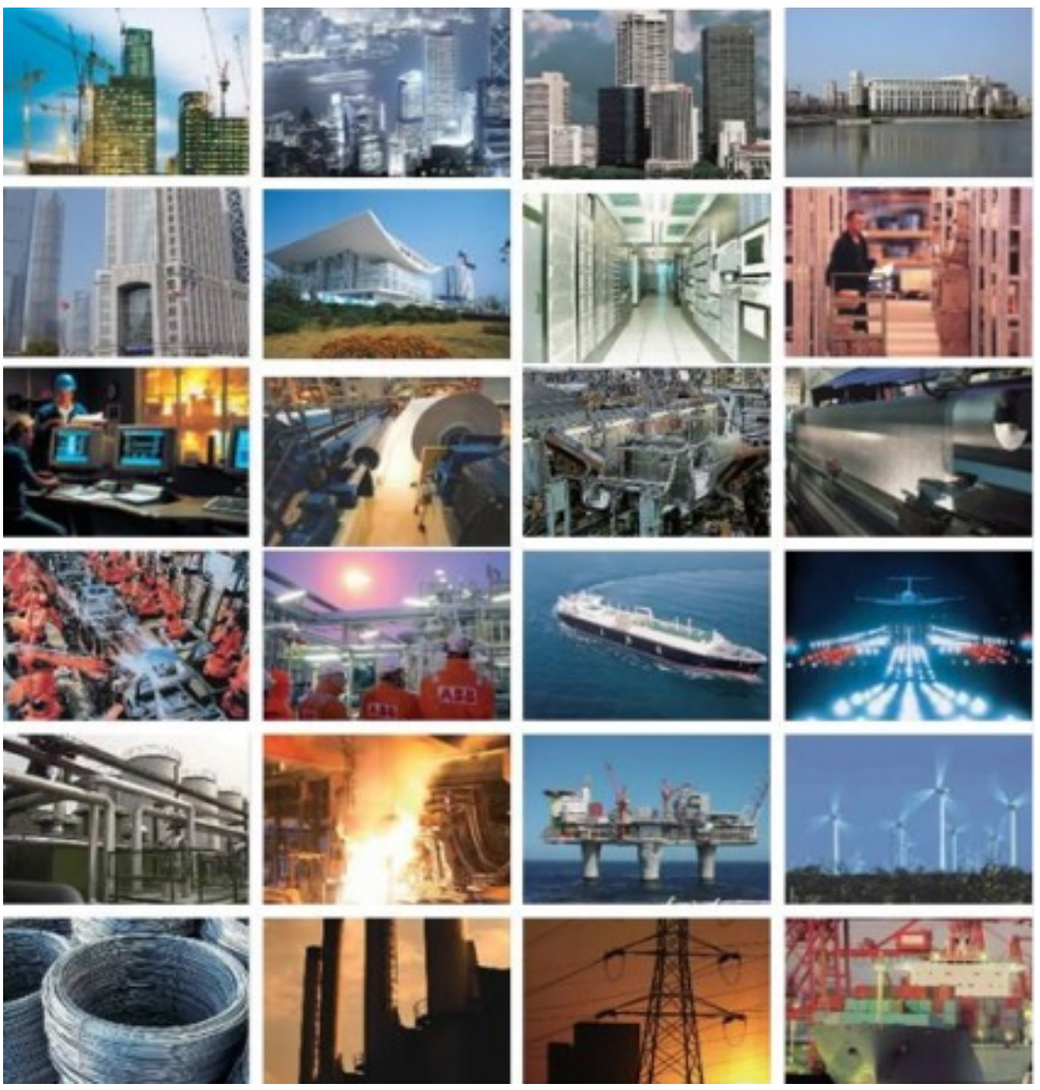
Financial communication *

Office buildings *

Shopping malls *

Storage center *

* Indicates applications most suitable for MDmax FC



Working and environmental conditions

MDmax® LV switchgear cabinet is electrical equipment suitable for indoor mounting

Environment temperature：

Short time maximum temperature：+ 40℃

Maximum average temperature for 24 hours:+ 35℃

Minimum temperature:-5℃

Reduce the capacity of equipment when it runs in the temperature higher than above mentioned one.

Environmental conditions

Climatic environment for normal working shall obey provisions in GB725.1-2005 and IEC60439-1. Relative humidity of surrounding environment:50% on 40℃.

Conditions of indoor mounting positions for switchgear cabinet shall comply with requirements in corresponding standards.For places with possibility of condensation, measures such as ventilation or heating will be adopted in switchgear cabinet to prevent condensation.If the switchgear cabinet is mounted higher than elevation of 2000m, the equipment capacity shall be reduced

LV switchgear cabinet- MDmax ST

Product features/technical information

Model instruction

MDmax S T

- T — Trinity (three-in-one functional unit)
- S — Smart (intelligent)
- MDmax — Serial number of switchgear cabinet

Product features

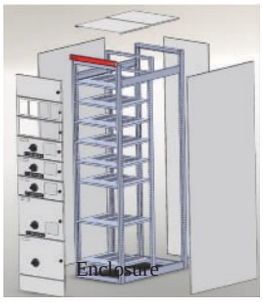
- The skeleton adopts aluminum coated zinc plate double-fold technology
- The header for horizontal bus area can be dismantled
- Has three functional units: drawer type, moveable, plug-in type
- Drawer type structure, equipped with 36 circuits to the most
- Able to fulfill the switching among three positions of drawer circuit without reducing protection grade
- Positioning of moveable parts of drawer, able to be equipped with sound, light and character indicators
- Perfect drawer type electrical circuit solution

Technical information

Standards Assembly type switchgear cabinet passing type test (TTA)		GB7251.1-2005,IEC60439-1, EN60439.1, DIN_VDE0660, part 500 BS5486, UTE63-410
Electrical specifications		
Rated voltage		
Rated insulation voltage		690V/1000V AC, 3P, 1500V DC
Rated working voltage		400V/690V AC, 3P, 750V DC
Rated pulse withstand Uimp		6 / 8 / 12kV
Overvoltage level		Ⅱ / Ⅲ/ Ⅳ
Pollution degree		3
Rated working frequency		To 60Hz
Rated current		
Main bus	Rated current of main bus 1e	To 6300A
	Rated peak withstand current 1pk	To 220kA
	Rated short-time withstand current 1cw	To 100kA
Distribution bus	Rated current of distribution bus 1e	To 2000A
	Rated peak withstand current 1pk	To 176kA
	Rated short-time withstand current 1cw	To 80kA
Structural characteristics		
Dimension		Modulus:E=25mm (Complying with standard DIN43660)
Cabinet body and support members DIN41488		
Recommended height 2200mm		
Recommended width 400, 600, 800, 1000, 1200mm		
Recommended depth 600, 800, 1000, 1200mm		
Surface protection		
Skeleton		Aluminum coated zinc
Internal cell partitions and element mounting plate		Aluminum coated zinc
Enclosure		Electrocoating bright grey RAL 7035 color code
Protection grade		
Partition type		
According to IEC60529 or 00PI05004NID		To IP54
Internal cell partition		To Form 4b
Plastic parts		
Halogen-free, self-extinguishing		Part 3 of DIN VDE0304
CFC-free, inflaming retarding		IEC60707

LV switchgear cabinet-MDmax ST

Product features/technical information

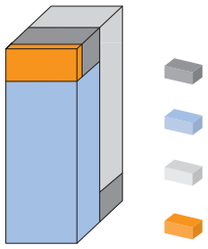


Enclosure

Functional compartment of switchgear cabinet

Switchgear cabinet is divided into four parts:

- Bus compartment
- Functional unit compartment
- Cable chamber
- Horizontal wiring area of secondary control line



- Bus compartment
- Functional unit compartment
- Cable chamber
- Horizontal wiring area of secondary control line

Dimensions of switchgear cabinet (mm)

Recommended height	2200
Recommended width	
Fixed type structure	400/600/800/1000/1200
Drawer type structure	600
Recommended depth	
Drawer type structure	1000/1200
Moveable structure	600/800/1000/1200
Plug-in structure	600/800/1000/1200
Standard unit structure	
Drawer type	200/300/400/600
Moveable type	150/200/300
Plug-in type	150/200/300/400
Standard mounting modulus distance	25

Skeleton

Mechanical design

Frame structure

Frame of MDmax ST adopts self-bearing frame structure which is assembled by double-fold G sectional materials. Modulus holes are arranged in interval of 25mm on the skeleton, making the assembly of cabinet frame convenient and extremely solid.The whole frame is accurately connected with horizontal and longitudinal bolts; frame structure is maintenance-free.Skeleton, partitions and mounting plates are all made by aluminum coated zinc plates.

Brace

Enclosure

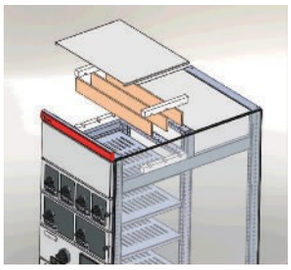
The enclosure of MDmax ST switchgear cabinets is made by galvanized and powder coated steel sheets to ensure maximum durability.Door plate, roof, rear plate, partitions and side plates are mounted with tapping screws; final cabinet structure shall be determined according to protection grade requirement.According to requirements for regular security system, chambers or gap spaces for debugging operation and maintenance are all installed with independent door plates.

Bus system

Main bus

Main bus is arranged on top of switchgear cabinet (within bus compartment). Material of bus is copper (Cu).Each phase, according to current grade, can be single, double or three; bus compartment space can be expended as required.To facilitate bus installation on construction site, the header of bus compartment can be dismantled.Bus can also be separated as a transportation unit.

The main bus system mounted on top of switchgear cabinet are completely separated from functional unit area, cable area and secondary line horizontal wiring area to ensure sufficient safe distance for maintenance personnel.



Main bus

According to DIN40500, the bus system and all relevant components are in copper.Except bare copper (standard scheme), bus bar can also select silver/tin plating, or complete insulation scheme with heating shrink sleeve as required.

Ground protection bar and neutral bar

Grounding protection bar and neutral bar are mounted on lower back of the switchgear cabinet; PE bar is fixed on frame to ensure electrical continuity. In some applications, due to unbalanced phase or harmonic wave, when the neutral bar is required to reach 50% or 100% of the phase,Or when the incoming line switch is at pole 4,the neutral bar can be placed parallel with main bus in the main bus area.

Ground protection bar and neutral bar

Distribution bus

3-pole or 4-pole distribution bus system can be arranged together; standard distribution bus is in bare copper, or silver/tin plated as required.

Distribution bus

Distribution bus cover

Distribution bus cover with ventilation holes can be dismantled independently behind the cabinet to facilitate heat dissipation, thus to improve current-carrying effect, as well as to facilitate regular detection and maintenance.If necessary, the bus can also be replaced to improve current-carrying volume. ◦

Distribution bus cover

1/4 units

1/2 units

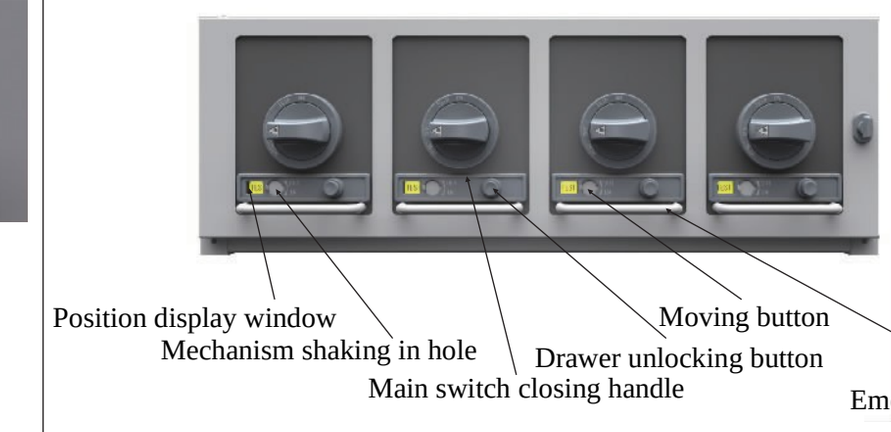
Operation panel

Drawer type unit

The drawer type unit is mainly used for industrial applications requiring high reliability, especially motor control center (MCC).
The drawer can be easily replaced during the operation of equipment to ensure continuity of electric equipment.

Small drawer

Small drawer includes drawers in two types: 1/4 units and 1/2 units. This series of drawers has unique technology, compact design. Maximum 36 smallest 1/4 units (U) can be mounted in the functional area, thus can reduce total quantity of switchgear cabinets, as well as reduce floor space of switchgear cabinets to the most.This series of drawers are composed by fixed components and moveable components (connectors).After pushing fixed components of drawer into unit chamber of switchgear cabinet, door of the unit chamber module shall be closed.Insert rocker at this time can switch moveable components of the drawer among positions of isolation, test and connection in sequence.The indicating window with LED displays position status of connectors.



Operation method:

- Press unlock button of drawer and push it in; close the module door.
- Shake the rocker in clockwise to complete the switching among positions of isolation, test and connection in sequence.The position indicating window will display the current connection status.
- After shaken to connection position, take down the rocker, turn the moving button to left, close rocker hole, then the main switch can be closed.
- After tripping of main switch, turn the moving button to right, insert the rocker; shake anti-clockwise to quit the positions of connection, test and isolation in sequence.
- After opening unit module door, press the drawer unlock button, then the small drawer can be moved out.

Full width drawer

Drawer

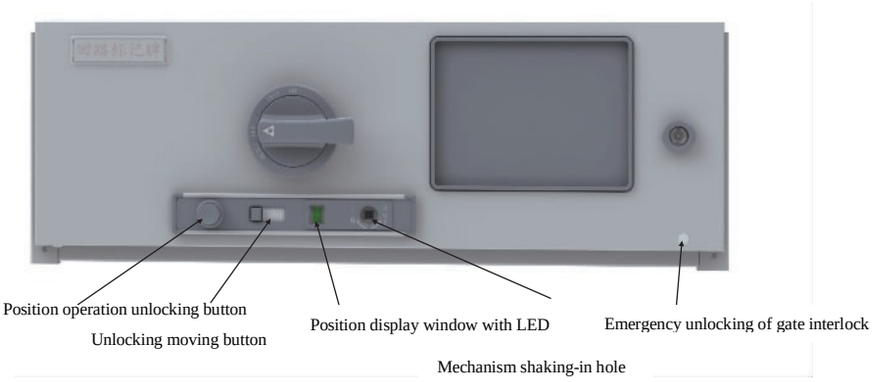
Dashboard can be overturned by 90° forward to facilitate onsite upgrading and modification

Full width drawer

This series of drawers have four heights including 1U/ 1.5U /2U/ 3U (U=200mm).This series of drawers are composed by fixed components and moveable components (connectors).After pushing fixed components of drawer into unit chamber of switchgear cabinet, insert rocker to switch moveable components of the drawer among positions of isolation, test and connection in sequence.The indicating window with LED will display position status of connectors.

No matter manual or electrical, both drawer door plate and switch have mechanical interlocking mechanism, i.e. not matter manual or electrical scheme, as long as the switch is closed, door of the drawer module shall not be able to be opened.

All operations on drawer don’t require opening of door. When switching among the three positions, protection grade will not be lost. Full width drawer is directly connected by hinge valve and vertical bus on front of vertical bus cover.Cables of main circuit and auxiliary circuit can be connected in cable chamber.



Drawer operation method when opening, closing the breaker manually:

1) Open the unit door, push in the drawer along the guide rail and close unit door.
2) Press the position operation unlocking button (hereafter called as the unlocking button), shake the rocker clockwise into the test position, the unlocking button will pop-up and reset.
3) Press the unlocking button again, shake the rocker clockwise into the connection position, the unlocking button will pop-up and reset.
4) Take down the rocker, turn the unlocking moving button (hereafter called as the moving button) left.The rocker hole will be closed and the unlocking button will be locked at the same time.At this moment, the main switch can be closed.
5) After tripping of main switch, turn the moving button right, press the unlocking button, insert the rocker and shake anti-clockwise from connection to test position, the unlocking button will pop-up and reset.
6) Press the unlocking button again, shake the rocker anti-clockwise to the isolation position, the unlocking button will pop-up and reset.
7) Take out the rocker, open the unit door and lift the drawer shutting handle upward to move the drawer out.

Operation legend of full width drawer
Schematic diagram for pushing in of drawer

Push in the drawer along the guide rail

Close the door of drawer module

Press the unlocking button and then the rocker can be rotated clockwise

Turn the moving button left to lock the unlocking button and rocker hole

Schematic diagram for quit of drawer

The moving button shall be turned to right

Press the unlocking button and then the rocker can be rotated anti-clockwise

Open the door of drawer module

Lift the handle of pedal, and then pull the drawer out along the guide rail

MDmax ST drawer scheme with electrical operation

By adding electric operation mechanism on plastic breaker, the remote control function can be fulfilled; electrical interlocking function can be provided perfectly. It is only when the breaker is tripped, the drawer can be moved.

Operation method for drawers with electric operation breaker:

1) Open the unit door, push in the drawer along the guide rail and close unit door.
2) Press the unlocking button, shake the rocker clockwise into the test position, the unlocking button will pop-up and reset.
3) Press the unlocking button again, shake the rocker clockwise into the connection position, the unlocking button will pop-up and reset.
4) Take down the rocker, turn the moving button left, the rocker hole will be closed and the unlocking button will be locked at the same time.
5) At this time, tripping button for electric operation mechanism can be pressed to close the main switch.
6) After the main switch is tripped via electric operation mechanism, turn the moving button right. The rocker hole will open. Release the unlocking button.
7) Press the unlocking button, insert the rocker, shake anti-clockwise to quit from connection to test position. The unlocking button will pop-up and reset.
8) Press the unlocking button again, shake the rocker anti-clockwise into the isolation position, the unlocking button will pop-up and reset.
9) Take out the rocker, open the unit door and lift the drawer shutting handle upward to move the drawer out.
10) If due to misoperation, the main switch is not broken and the rocker hole is not closed.If it is needed to move out from the connection position, the position operation unlocking button shall be pressed. This unlocking button will trigger the tripping of main switch, thus to ensure that the drawer will move only under the situation with the main switch broken.

Movable unit

Both incoming/outgoing line sides of functional units in this series adopt connector assembly technology. Functional units adopt manual positioning. In door opening, it has two positions: isolation and connection.It is broadly applied in motor control circuit less than 37KW in fixed switchgear cabinet.Height of standard unit:150/200/300mm

Movable unit

Moveable switchgear cabinet

Fixed isolation unit

When the functional unit has relatively bigger current, to ensure reliability of the connector, plug-in type or pulling out type switch is selected to ensure convenience and security of operation and maintenance by effective separation of each functional unit chamber.This series of functional units are also frequently used in power distribution circuits in building industry. Height of standard unit:150 /200 /300 /400mm

Fixed isolation unit

LV switchgear cabinet-MDmax ST

Arc protection of switchgear cabinet

In actual operation of electric equipment, fault arc may be caused in the switchgear cabinet due to numerous factors, including man-made mistake, incorrect connection, animal intrusion and so on.And in most of the accidents, operators are carrying out maintenance or mounting works in switchgear cabinet.In this situation, the cabinet door is frequently open. The open cabinet door causes the loss of anti-arc function of the whole cabinet. Therefore, MDmax adopts active anti-arc device - TVOC-2 of ABB to protect safety of operators and the switchgear cabinet.

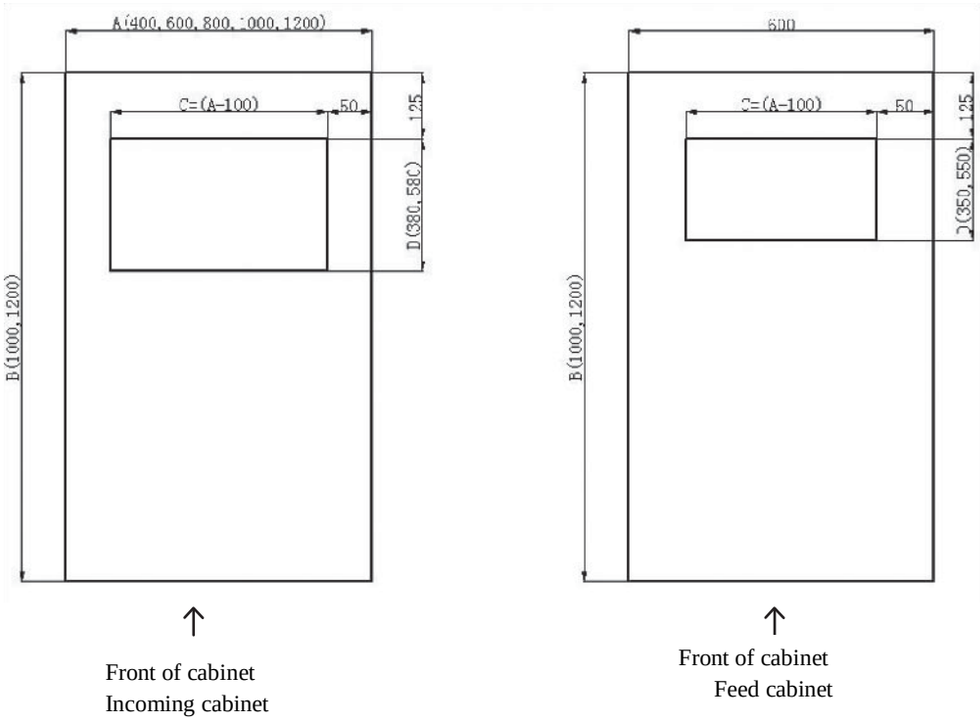
In MDmax switch cabinet, as shown in the following figure, arc sensor is mounted.When the arc control system detects fault arc, it will send trip signal to the breaker.In this case, detection response time is 1ms.And the time from the moment arc flux is detected to the main pole contact of the breaker is open is only 35 to 45ms, which significantly limits the hazards caused by fault arc.

LV switchgear cabinet-MDmax ST

Mounting dimension chart

Bore hole drawing for cable chamber

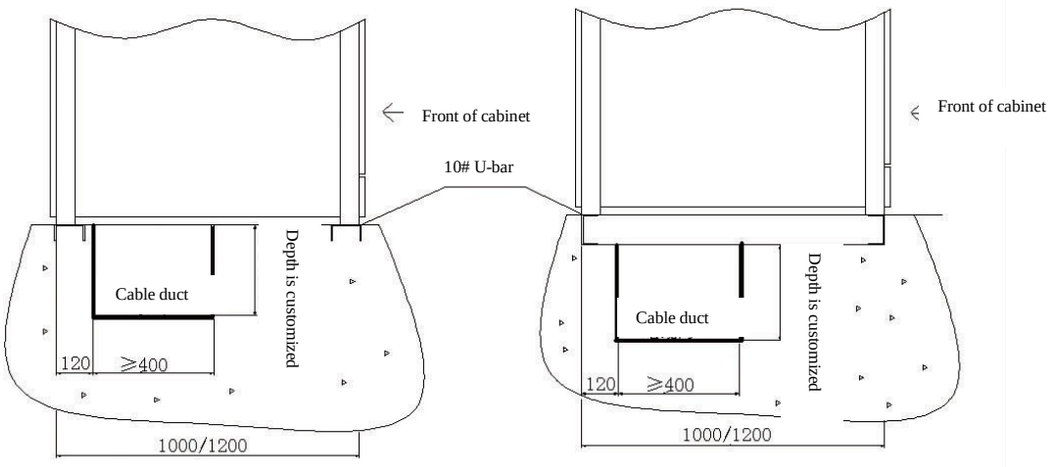
If the site is cable or wire incoming/outgoing lines, the bottom (top) plate shall be cut out (square or round holes).Refer to the attached figure for hole sizes (all in mm).



Front of cabinet
Incoming cabinet

Front of cabinet
Feed cabinet

Mounting foundation drawing

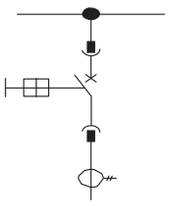
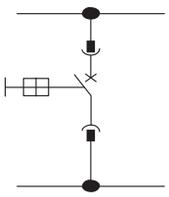


Mounting foundation drawing I (side view)

Mounting foundation drawing II (side view)

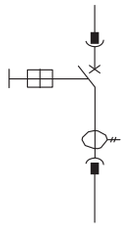
LV switchgear cabinet-MDmax ST

Primary circuit scheme

Scheme No.	1				2			
Main circuit diagram								
Application	Incoming				Busc			
Cabinet width	600	800	1000	1200	600	800	1000	1200
Cabinet depth	1000			1200	1000			1200
Equipment height occupied mm	-				-			
Breaker								
E1 800 3P	#				#			
E2 1250 3P	#				#			
E2 1600 3P	#				#			
E2 2000 3P	#				#			
E3 2500 3P	#					#		
E3 3200 3P	#					#		
E4 4000 3P		#					#	
E6 5000 3P				#				#
E6 6300 3P				#				
E1 800 4P	#				#			
E2 1250 4P	#				#			
E2 1600 4P	#				#			
E2 2000 4P	#				#			
E3 2500 4P		#				#		
E3 3200 4P		#					#	
E4 4000 4P			#					#
E6 5000 4P				#				

LV switchgear cabinet-MDmax ST

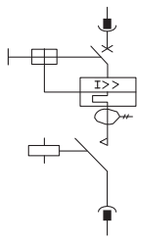
Primary circuit scheme (drawer type unit)

Scheme No.	3					
Main circuit diagram						
Application	Feed, lighting					
Cabinet width	600					
Cabinet depth	1000					
Equipment height occupied mm	U/4	U/2	U	1.5U	2U	3U
Breaker						
S800S-C20 3P	#					
S800S-C32 3P	#					
T1 160 R63 3P		#				
T1 160 R80 3P			#			
T1 160 R125 3P			#			
T1 160 R160 3P			#			
T2 160 R63 3P		#				
T2 160 R80 3P			#			
T2 160 R100 3P			#			
T2 160 R125 3P			#			
T2 160 R160 3P			#			
T3 250 R250 3P			#			
T4 250 R250 3P			#			
T5 400 R320 3P				#		
T5 400 R400 3P				#	#	
T5 630 R500 3P					#	#
T5 630 R630 3P					#	#

Note:U = 200mm

LV switchgear cabinet-MDmax ST

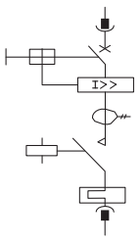
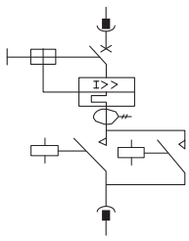
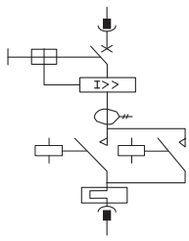
Primary circuit scheme (drawer type unit)

Scheme No.				4		
Main circuit diagram						
Application				Motor control circuit (direct start)		
Cabinet width				600		
Cabinet depth				1		
Equipment height occupied			mm	U/4	U/2	U
Power Pe(Kw)	Breaker	Contactor	Hot key electric appliance			
0.06	MS132-0.25	A9		#		
0.09	MS132-0.4			#		
0.12	MS132-0.63			#		
0.25	MS132-1.0			#		
0.55	MS132-1.6			#		
0.75	MS132-2.5			#		
1.5	MS132-4.0	A16		#		
2.2	MS132-6.3	A26		#		
4	MS132-10			#		
5.5	MS132-12			#		
7.5	MS132-16	A30		#		
11	MS132-25			#		
15	MS132-32					
18.5	T2 160 R52 3P	A50	TA75 DU52		#	
22					#	
30	T2 160 R80 3P	A75	TA75 DU63			#
37			TA75 DU80			#
45	T2 160 R100 3P	A95	TA95 DU90			#
55	T2 160 R160 3P	A110	TA110 DU110			#
75	T3 250 R200 3P T4 250 R200 3P	A145	TA200 DU150			
90	T5 400 R320 3P	A185	TA200 DU175			
110	T5 400 R320 3P	A210	TA450 DU235			
132	T5 400 R320 3P	A260	TA450 DU310			
160	T5 400 R400 3P	AF400	TA450 DU400			
200	T5 630 R630 3P					

Note:U = 200mm

LV switchgear cabinet-MDmax ST

Primary circuit scheme (drawer type unit)

5		6		7	
					
Motor control circuit (direct start)		Motor control circuit (positive inversion)			
600		600			
1000		1000			
2U	3U	U/2	U	2U	3U
		#			
		#			
		#			
		#			
		#			
		#			
		#			
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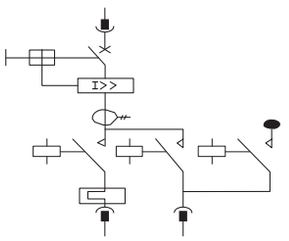
LV switchgear cabinet-MDmax ST

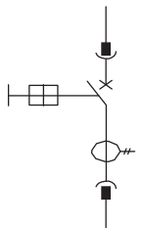
Primary circuit scheme (drawer type unit)

Scheme No.				8		
Main circuit diagram						
Application				Motor control circuit (star-delta)		
Cabinet width				600		
Cabinet depth				1000		
Equipment height occupied mm				U	2U	3U
Power Pe(Kw)	Breaker	Contactor Main A	Contactor Star	Hot key electric appliance		
18.5	T2 160 R40 3P	A50	A26	TA75 DU25	#		
22	T2 160 R50 3P			TA75 DU32	#		
30	T2 160 R63 3P	A63	A30	TA75 DU42	#		
37	T2 160 R80 3P	A75	A30	TA75 DU52	#		
45	T2 160 R100 3P			TA95 DU63	#		
55	T3 250 R160 3P T4 250 R160 3P		A40		#		
75	T3 250 R200 3P T4 250 R200 3P	A95	A75	TA200 DU90		#	
90	T5 400 R320 3P	A110	A75	TA200 DU110		#	
110	T5 400 R320 3P	A145	A95	TA450 DU135			#

Note:U = 200mm

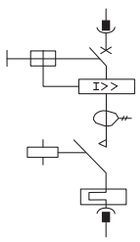
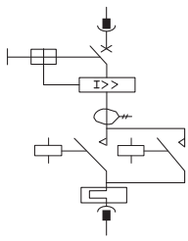
LV switchgear cabinet-MDmax ST

Primary circuit scheme (moveable unit)

Scheme No.	9	
Main circuit diagram		
Application	Feed, lighting	
Cabinet width	600	
Cabinet depth	1000	
Equipment height occupied mm	150	200
Breaker		
T1 160 R32 3P	#	
T1 160 R63 3P	#	
T1 160 R80 3P	#	
T1 160 R100 3P	#	
T1 160 R125 3P	#	
T1 160 R160 3P	#	
T2 160 R20 3P	#	
T2 160 R32 3P	#	
T2 160 R63 3P	#	
T2 160 R80 3P	#	
T2 160 R100 3P	#	
T2 160 R125 3P	#	
T2 160 R160 3P	#	
T3 250 R250 3P		#
T4 250 R250 3P		#

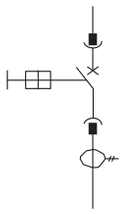
LV switchgear cabinet-MDmax ST

Primary circuit scheme (moveable unit)

Scheme No.				10			11	
Main circuit diagram								
Application				Motor control circuit (direct start)			Motor control circuit (positive inversion)	
Cabinet width				6			600	
Cabinet depth				1			1000	
Equipment height occupied			mm	150	200	300	150	200
Power Pe(Kw)	Breaker	Contactor	Hot key electric appliance					
0.37	T2 160 R1.6 3P	A9	TA25DU1.4	#			#	
0.55			TA25DU1.8	#			#	
0.75	T2 160 R2 3P		TA25DU2.4	#			#	
1.1	T2 160 R3.2 3P		TA25DU4	#			#	
1.5	T2 160 R4 3P	A16	TA25DU5	#			#	
2.2	T2 160 R5 3P	A26	TA25DU6.5	#			#	
3	T2 160 R8.5 3P		TA25DU8.5	#			#	
4	T2 160 R11 3P	A30	TA25DU11	#			#	
5.5	T2 160 R12.5 3P		TA25DU14	#			#	
7.5	T2 160 R20 3P		TA25DU19	#			#	
11	T2 160 R32 3P		TA42DU25	#			#	
15	T2 160 R52 3P	A50	TA75DU42		#			
18.5			TA75DU52		#			#
22					#			#
30	T2 160 R80 3P	A63	TA75 DU80			#		
37		A75				#		

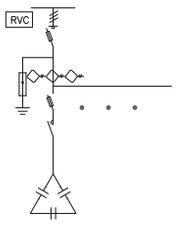
LV switchgear cabinet-MDmax ST

Primary circuit scheme (fixed partitioning unit)

Scheme No.	12			
Main circuit diagram				
Application	F			
Cabinet width	6			
Cabinet depth	1			
Equipment height occupied mm	150	200	300	400
Breaker				
T2 160 R20 3P	#			
T2 160 R32 3P	#			
T2 160 R63 3P	#			
T2 160 R80 3P	#			
T2 160 R100 3P	#			
T2 160 R125 3P	#			
T2 160 R160 3P	#			
T3 250 R250 3P		#		
T4 250 R250 3P		#		
T5 400 R320 3P			#	#
T5 400 R400 3P			#	#
T5 630 R500 3P			#	#
T5 630 R630 3P			#	#
T2 160 R20 4P		#		
T2 160 R32 4P		#		
T2 160 R63 4P		#		
T2 160 R80 4P		#		
T2 160 R100 4P		#		
T2 160 R125 4P		#		
T2 160 R160 4P		#		
T3 250 R250 4P			#	
T4 250 R250 4P			#	
T5 400 R320 4P				#
T5 400 R400 4P				#
T5 630 R500 4P				#
T5 630 R630 4P				#

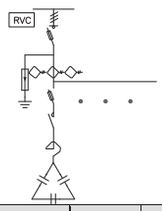
LV switchgear cabinet-MDmax ST

Primary circuit scheme (reactive power compensation)

Scheme No.		13				
Main circuit diagram						
NO.		13A	13B	13C	13D	13E
Compensation capacity	KVAR	150	180	240	300	360
Model and specification		Quantity				
Disconnector	OT400E03P	1	1			
	OT630E03P			1	1	
	OT800E03P					1
	Power factor controller RVC-6	1	1			
	RVC-8			1		
	RVC-10				1	
	RVC-12					1
Fuse switch disconnector (square) XLP000-6CC		6	6	8	10	12
Fuse	OFAFC000GG80	18	18	24	30	36
	Contractor for capacitor switchover UA53-30-11	6				
	UA63-50-11		6	8	10	12
LV capacitor	CLMD33/43-25 KVAR	6				
	CLMD33/43-30 KVAR		6	8	10	12
Cabinet width(mm)		600	800	800	1000	1000

LV switchgear cabinet-MDmax ST

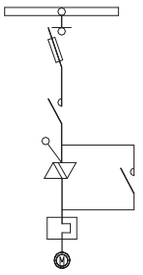
Primary circuit scheme (reactive power compensation)

		7% electric reactor (mainly used for restraining of quintuple and above harmonic waves)						14% (mainly used for restraining of triple and above harmonic waves				
Scheme No.		14						15				
Main circuit diagram												
NO.		14A	14B	14BB	14C	14CC	14D	15A	15B	15BB	15C	15CC
Compensation capacity	KVA	180	240	240	300	300	360	180	240	240	300	300
Model and specification		Quantit										
Disconnector												
OT400E03P		1						1				
OT630E03P			1	1	1	1			1	1	1	1
OT800E03P							1					
Powerfactor controller												
RVC-6		1		1				1		1		
RVC-8			1			1			1			1
RVC-10					1		1				1	
Fuse switch disconnector (square)												
XLP000-6CC		6	8	1	10	2	2	6	8	1	10	2
XLP00				5		6	7			5		6
Fuse												
OFAFC000GG40				3		6	3			3		6
OFAFC000GG80		18	24		30		3	18	24		30	
OFAFC00G125				15		18	21			15		18
Contactor												
A30-30-10(shall be equipped with auxiliary contact CA5-01)				1		2	1			1		2
A63-30-11		6	8		10		1	6	8		10	
A95-30-11				5		6	7			5		6
LV capacitor												
CLMD43/20.8KAVR480V50Hz				1		2	1					
CLMD53/40.8KAVR480V50Hz		6	8		10		1					
CLMD63/60.8KAVR480V50Hz				5		6	7					
CLMD43/22.5KAVR 525V 50Hz								6		1		2
CLMD53/44.9KAVR 525V 50Hz									8		10	
CLMD63/67.8KAVR 525V 50Hz										5		6
LV electric reactor												
15KVAR 400V 50Hz				1		2	1			1		2
30KVAR 400V 50Hz		6	8		10		1	6	8		10	
45KVAR 400V 50Hz				5		6	7			5		6
Step size		222222	22222222	133333	2222222222	111333333	123333333	222222	22222222	133333	2222222222	111333333
Cabinet width(mm)		800	800	800	1000	800	1000	800	800	800	1000	1000

Note: Capacitor cabinet with electric reactor shall be equipped with fan, of which the dimension and quantity depend on multiple factors such as protection grade of the cabinet and size of air intake.

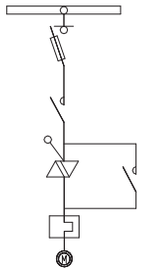
LV switchgear cabinet-MDmax ST

Primary circuit scheme

Scheme No.		16						
Main circuit diagram								
Application		Motor control circuit (soft start, 1 control 1)						
Power	kW	11	15	18.5	22	25	30	37
Current	A	25	28	37	44	50	60	72
Disconnector fuse set		OS32GD03P		OS63GD03P				OS125GD03P
Quick fuse set		170M1566		170M1568	170M1569		170M1570	170M1571
Main circuit contactor		A26	A30	A40	A50		A63	A75
Bypass contactor								
Soft starter		PST30		PST37	PST44	PST50	PST60	PST72
Thermal overload relay		Built-in soft starter						
Occupied height of the unit		900						
Occupied width of the unit		500						
Cabinet dimension (W X D) mm		600 / 800 / 1000 x 600 / 800 / 1000						
Partition type		2 / 3						
Remark								

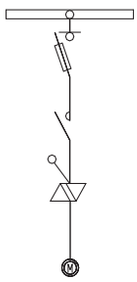
LV switchgear cabinet-MDmax ST

Primary circuit scheme

Scheme No.		17						
Main circuit diagram								
Application		Motor control circuit (soft start, 1 control 1)						
Power	kW	45	55	75	90	110	132	160
Current	A	85	105	142	175	193	250	300
Disconnector fuse set		OS125GD03P	OS250D03P	OS400D03P				OS630D03P
Quick fuse set		170M1572	170M3819	170M5809	170M5810	170M5812	170M5813	170M6813
Main circuit contactor		A95	A110	A145	A185	A210	A260	A300
Bypass contactor								
Soft starter		PST85	PST105	PST142	PST175	PST210	PST250	PST300
Thermal overload relay		Built-in soft starter						
Occupied height of the unit		1800						
Occupied width of the unit		500			600			
Cabinet dimension (W X D) mm		600 / 800 / 1000 x 600 / 800 / 1000						
Partition type		2 / 3						
Remark								

LV switchgear cabinet-MDmax ST

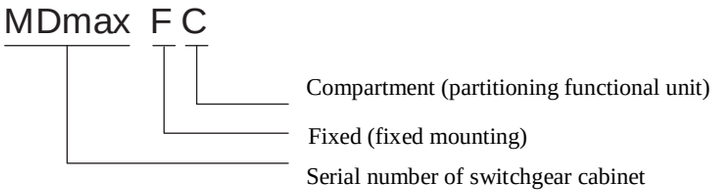
Primary circuit scheme

Scheme No.	18							
Main circuit diagram								
Application	Motor control circuit (soft start, 1 control 1)							
Power kW	200	250	290	315	355	400	450	560
Current A	340	432	470	524	662	680	720	1050
Disconnector fuse set	OS400D03P	OS630D03P			OS800D03P		OT1250	
Quick fuse set	170M5813	170M6813			170M8554		170M6018	170M6020
Main circuit contactor	AF400	AF460	AF580		AF750		AF1350	AF1650
Bypass contactor	Built-in soft							
Soft starter	PSTB370	PSTB470	PSTB570		PSTB720		PSTB840	PSTB1050
Thermal overload relay	Built-in soft							
Occupied height of the	1800							
Occupied width of the	600		800					
Cabinet dimension	600 / 800 / 1000 x 600 / 800 / 1000							
Partition type	2 / 3							
Remark								

LV switchgear cabinet-MDmax FC

Product features/technical information

Model instruction



Product features

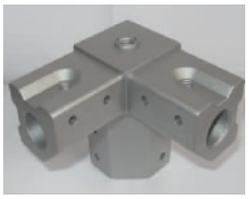
- T-shaped skeleton system is adopted to improve protection grade of the cabinet.
- The cabinet frame is assembled with tee joint to prevent vortex. Symmetry precision of the cabinet is good.
- Novel glass door design has improved security and ornamental value of the switchgear cabinet.
- Plug-in or drawout breaker is adopted to ensure safety during replacement and repair of elements.
- There are up to 18 feed out circuits of distribution control cabinet (partitioning form 3b)

Technical information

Standards Assembly type switchgear cabinet passing type test (TTA)	GB7251.1-2005,IEC60439-1, EN60439.1, DIN_VDE0660, part 500 BS5486, UTE63-410
Electrical specifications	
Rated voltage	
Rated insulation voltage	690V/1000V AC, 3P, 1500V DC
Rated working voltage	400V/690V AC, 3P, 750V DC
Rated pulse withstand Uimp	6 / 8 / 12kV
Overvoltage level	Ⅱ / Ⅲ/ Ⅳ
Pollution degree	3
Rated working frequency	To 60Hz
Rated current	
Main bus Rated current of main bus 1e	To 6300A
Rated peak withstand current 1pk	To 220kA
Rated short-time withstand current 1cw	To 100kA
Distribution bus Rated current of distribution bus 1e	To 2000A
Rated peak withstand current 1pk	To 166kA
Rated short-time withstand current 1cw	To 75kA
Structural characteristics	
Dimension	Modulus:E=25mm (Complying with standard DIN43660)
Cabinet body and support members DIN41488	
Recommended height 2200mm	
Recommended width 400, 600, 800, 1000, 1200mm	
Recommended depth 600, 800, 1000, 1200mm	
Surface protection	
Skeleton	Aluminum coated zinc
T-joint	5# zinc alloy
Internal cell partitions and element mounting plate	Aluminum coated zinc
Internal chamber door plate and enclosure	Electrocoating bright grey RAL 7035 color code
Protection grade	
Partition type	
According to IEC60529	To IP54
Internal cell partition	To Form 4b
Plastic parts	
Enclosure surface is treated with paint	High temperature epoxy powder polymerization
Front door	5mm high temperature resistance tempered glass and 2mm cold rolled plate

LV switchgear cabinet-MDmax FC

Product features/technical information



T-joint

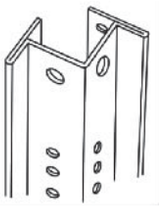
Fixed isolation unit

But

Mechanical design

Frame structure

Basic structure of the skeleton of MDmaxF adopts double-fold process and is composed by T sectional material made by aluminum coated zinc plates.Modulus holes are arranged in 25mm interval on the skeleton; assembly of the frame is rapid and flexible.



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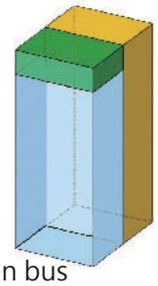
Enclosure

MDmaxFC is equipped with metal door with high strength glass. Waterproof sealing strips and grounding screws are applied.The back of cabinet can adopt door or door plate, and is already set with waterproof sealing strips and grounding screws.

Appearance

The interior of frame is divided into three chambers partitioning to each other :

- Device chamber of element modules
- Bus compartment for main bus and distribution bus
- Cable incoming and outgoing chamber (upper, lower incoming and outgoing are allowed)



Bus compartment

Electric apparatus room

Cable chamber

Bus system

Main bus and distribution bus

Main bus is equipped in bus compartment, installed on top of cabinet horizontally.
Capacity of the main bus is 800-6300A.
Distribution bus is mounted vertically; capacity of distribution bus is 800-2000A.
According to standard DIN40500, the bus system and all relevant components shall be in copper.Except bare copper (standard scheme), bus bar can also select silver/tin plating, or complete insulation scheme with heating shrink sleeve as required.

Fixed partitioning switchgear cabinet frame structure

Height, depth, width of modulized cabinet

Height of cabinet:Standard 2100 + 100mm (bottom frame)

Depth of cabinet:Standard: 800 / 1000mm

Width of cabinet:Standard: 700mm, 900mm, 1100mm

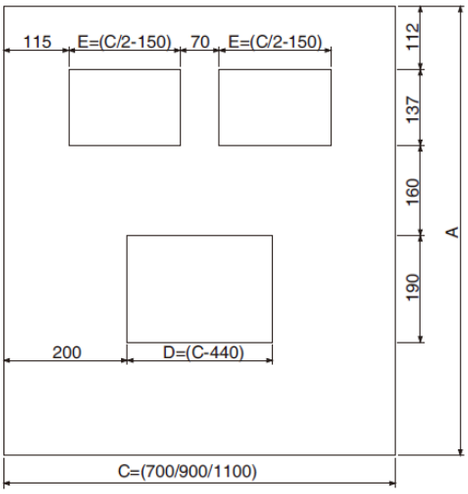
Enclosure protection: IP40~IP55

Internal partitioning form:Form 1~4b

LV switchgear cabinet-MDmax FC

Mounting dimension chart

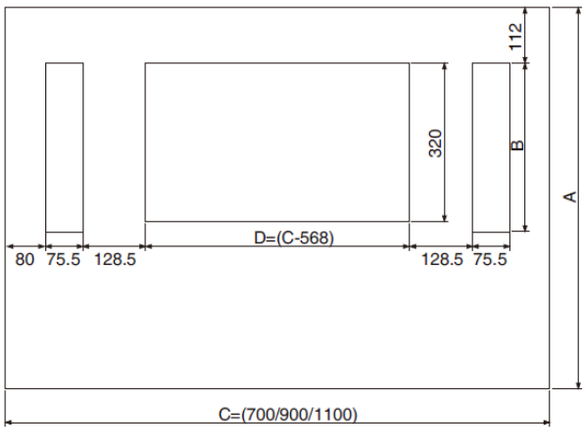
Bore hole drawing for cable chamber



Front of cabinet

Incoming cabinet

A	B
800	160
1000	260
1200	360

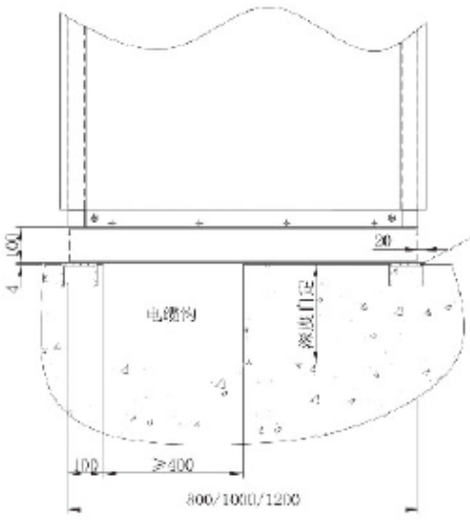


Front of cabinet

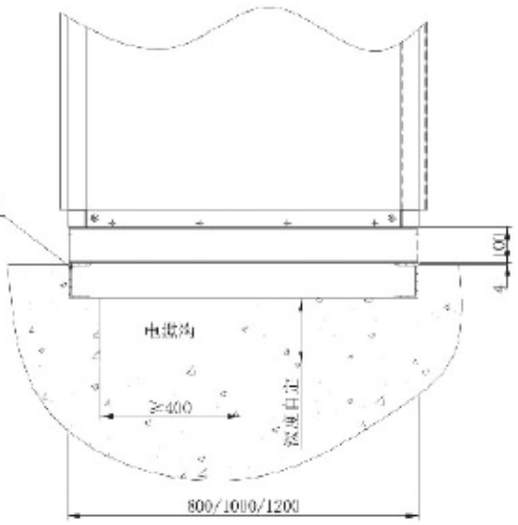
Feed cabinet

A	B
800	340
1000	540
1200	540

Mounting foundation drawing



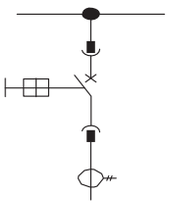
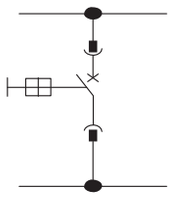
Mounting foundation drawing I (side view)



Mounting foundation drawing II (side view)

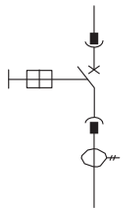
LV switchgear cabinet-MDmax FC

Primary circuit scheme

Scheme No.	1				2			
Main circuit diagram								
Application	Incoming line/feeder line				Buscouple			
Cabinet width	700	900	1100		700	900	1100	
Cabinet depth	800/1000		1000	1200	800/1000		1000	1200
Equipment height occupied mm	-				-			
Breaker								
E1 800 3P	#				#			
E2 1250 3P	#				#			
E2 1600 3P	#				#			
E2 2000 3P	#				#			
E3 2500 3P	#					#		
E3 3200 3P	#					#		
E4 4000 3P		#					#	
E6 5000 3P				#				#
E6 6300 3P				#				
E1 800 4P	#				#			
E2 1250 4P	#				#			
E2 1600 4P	#				#			
E2 2000 4P	#				#			
E3 2500 4P		#				#		
E3 3200 4P		#					#	
E4 4000 4P			#					#
E6 5000 4P				#				

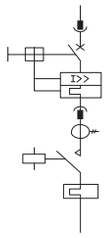
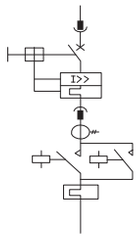
LV switchgear cabinet-MDmax FC

Primary circuit scheme (fixed partitioning unit)

Scheme No.	3	
Main circuit diagram		
Application	Feed, lighting	
Cabinet width	700/900	
Cabinet depth	800/1000	
Equipment height occupied mm	200	300
Breaker		
T2 160 R20 3P	#	
T2 160 R32 3P	#	
T2 160 R63 3P	#	
T2 160 R80 3P	#	
T2 160 R100 3P	#	
T2 160 R125 3P	#	
T2 160 R160 3P	#	
T3 250 R250 3P	#	
T4 250 R250 3P	#	
T5 400 R320 3P		#
T5 400 R400 3P		#
T5 630 R500 3P		#
T5 630 R630 3P		#
T2 160 R20 4P	#	
T2 160 R32 4P	#	
T2 160 R63 4P	#	
T2 160 R80 4P	#	
T2 160 R100 4P	#	
T2 160 R125 4P	#	
T2 160 R160 4P	#	
T3 250 R250 4P		#
T4 250 R250 4P		#
T5 400 R320 4P		#
T5 400 R400 4P		#
T5 630 R500 4P		#
T5 630 R630 4P		#

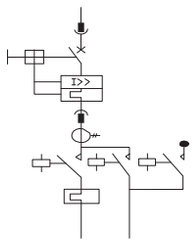
LV switchgear cabinet-MDmax FC

Primary circuit scheme (fixed partitioning unit)

Scheme No.				4			5		
Main circuit diagram									
Application				Motor control circuit			Motor control circuit		
Cabinet width				700/900			700/900		
Cabinet depth				800/1000			800/1000		
Equipment height occupied			mm	200	400	500	200	400	600
Power Pe(Kw)	Breaker	Contactor	Hot key electric appliance						
0.37	T2 160 R1.6 3P	A9	TA25DU1.4	#			#		
0.55			TA25DU1.8	#			#		
0.75	T2 160 R2 3P		TA25DU2.4	#			#		
1.1	T2 160 R3.2 3P	A16	TA25DU4	#			#		
1.5	T2 160 R4 3P	A16	TA25DU5	#			#		
2.2	T2 160 R5 3P	A26	TA25DU6.5	#			#		
3	T2 160 R8.5 3P		TA25DU8.5	#			#		
4	T2 160 R11 3P		TA25DU11	#			#		
5.5	T2 160 R12.5 3P		TA25DU14	#			#		
7.5	T2 160 R20 3P	A30	TA25DU19	#			#		
11	T2 160 R32 3P		TA25DU25	#			#		
15	T2 160 R52 3P		TA75DU42	#			#		
18.5	T2 160 R52 3P	A50	TA75DU52	#			#		
22				#			#		
30	T2 160 R80 3P	A75	TA75 DU63	#			#		
37			TA75 DU80	#			#		
45	T2 160 R100 3P	A95	TA95 DU90		#			#	
55	T3 250 R160 3P T4 250 R160 3P	A110	TA110 DU110		#			#	
75	T3 250 R200 3P T4 250 R200 3P	A145	TA200 DU150		#			#	
90	T5 400 R320 3P	A185	TA200 DU175		#			#	
110		A210	TA450 DU235			#			#
132		A260	TA450 DU310			#			#
160	T5 400 R400 3P	AF400	TA450 DU400			#			#
200	T5 630 R630 3P					#			#

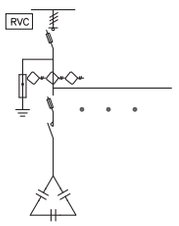
LV switchgear cabinet-MDmax FC

Primary circuit scheme (fixed partitioning unit)

Scheme No.					6	
Main circuit diagram						
Application					Motor control circuit (star-delta)	
Cabinet width					700/900	
Cabinet depth					800/1000	
Equipment height occupied mm					400	500
Power Pe(Kw)	Breaker	Contactor		Hot key electric appliance		
		Main A	Star			
18.5	T2 160 R40 3P	A50	A26	TA75 DU25	#	
22	T2 160 R50 3P			TA75 DU32	#	
30	T2 160 R63 3P	A63	A30	TA75 DU42	#	
37	T2 160 R80 3P	A75		TA75 DU52	#	
45	T2 160 R100 3P	A75	A30	TA95 DU63	#	
55	T3 250 R160 3P T4 250 R160 3P		A40		#	
75	T3 250 R200 3P T4 250 R200 3P	A95	A75	TA200 DU90	#	
90	T5 400 R320 3P	A110	A75	TA200 DU110		#
110	T5 400 R320 3P	A145	A95	TA450 DU135		#

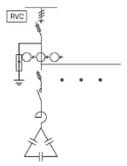
LV switchgear cabinet-MDmax FC

Primary circuit scheme (reactive power compensation)

Scheme No.		7				
Main circuit diagram						
NO.		7A	7B	7C	7D	7E
Compensation capacity	KVAR	150	180	240	300	360
Model and specification		Quantity				
Disconnector						
OT400E03P		1	1			
OT630E03P				1	1	
OT800E03P						1
Power factor controller						
RVC- 6		1	1			
RVC-8				1		
RVC-10					1	
RVC-12						1
Fuse switch disconnector (square)XLP000-6CC		6	6	8	10	12
Fuse OFAFC000GG80		18	18	24	30	36
Contractor for capacitor switchover						
UA53-30-11		6				
UA63-50-11			6	8	10	12
LV capacitor						
CLMD33/43-25	KVAR	6				
CLMD33/43-30	KVAR		6	8	10	12
Cabinet width(mm)		700	900	900	1100	1100

LV switchgear cabinet-MDmax FC

Primary circuit scheme (reactive power compensation)

	7% electric reactor (mainly used for restraining of quintuple and above harmonic waves)						14% (mainly used for restraining of triple and above harmonic waves				
Scheme No.	8						9				
Main circuit diagram											
NO.	8A	8B	8BB	8C	8CC	8D	9A	9B	9BB	9C	9CC
Compensation capacity KVAR	180	240	240	300	300	360	180	240	240	300	300
Model and specification	Quantity										
Disconnector OT400E03P	1						1				
OT630E03P		1	1	1	1			1	1	1	1
OT800E03P						1					
Power factor controller RVC-6	1		1				1		1		
RVC-8		1			1			1			1
RVC-10				1		1				1	
Fuse switch disconnector (square) XLP000-6CC	6	8	1	10	2	2	6	8	1	10	2
XLP00			5		6	7			5		6
Fuse OFAFC000GG40			3		6	3			3		6
OFAFC000GG80	18	24		30		3	18	24		30	
OFAFC00G125			15		18	21			15		18
Contactor A-30-30-10 (shall be equipped with auxiliary contact CA5-01)			1		2	1			1		2
A63-30-11	6	8		10		1	6	8		10	
A95-30-11			5		6	7			5		6
LV capacitor CLMD43/20.8KAVR 480V 50Hz			1		2	1					
CLMD53/40.8KAVR 480V 50Hz	6	8		10		1					
CLMD63/60.8KAVR 480V 50Hz			5		6	7					
CLMD43/22.5KAVR 525V 50Hz							6		1		2
CLMD53/44.9KAVR 525V 50Hz								8		10	
CLMD63/67.8KAVR 525V 50Hz									5		6
LV electric reactor 15KVAR 400V 50Hz			1		2	1			1		2
30KVAR 400V 50Hz	6	8		10		1	6	8		10	
45KVAR 400V 50Hz			5		6	7			5		6
Step size	2:2:2:2:2:2	2:2:2:2:2:22:2	1:3:3:3:3:3	2:2:2:2:2:2:2:2:2:2	1:1:3:3:3:3:3:3	1:2:3:3:3:3:3:3	2:2:2:2:2:2	2:2:2:2:2:2:2:2	1:3:3:3:3:3	2:2:2:2:2:2:2:2:2:2	1:1:3:3:3:3:3:3
Cabinet width (mm)	900	900	900	1100	900	1100	900	900	900	1100	1100

Note:Capacitor cabinet with electric reactor shall be equipped with fan, of which the dimension and quantity depend on multiple factors such as protection grade of the cabinet and size of air intake.

LV switchgear cabinet - MDmax®

Elements in the cabinet

Emax series air circuit breaker

Emax air circuit breaker provides protection and control functions for 800-6300A LV circuits.Emax air circuit breaker has multiple intelligent trippers for users to select.(More information please refer to the manual of Emax products)

Tmax series moulded case circuit breaker

Current of Tmax series moulded case circuit breaker covers all ratings within 4A~1600A. (More information please refer to the manual of Tmax products)

Power quality product

CLMD series capacitor and CLMR series reactor are used for reactive compensation, and are able to perfectly combined with UA series contactors as well as RVC and RVT power factor controllers to form automatic power factor regulation system.

PQFS active dynamic filter is able to efficiently restrain harmonic wave and improve power quality. (More information please refer to the manual of power quality products)

AC contactor

A and AF series AC contactors are commonly used in switchgear cabinet for motor control: A series: AC coil, 9-300A (AC-3) AF series: AC/DC universal coil, 9-2050A (AC-3) (

(More information please refer to the manual of AC contactor products)

TA series thermal overload relay

TTA is used for protection of motor and is able to be used together with A and AF series contactors.Setting range: 0.1-850A

(More informationplease refer to the manual of TA products)

Arc monitoring system

TVOC-2 series arc monitor includes main control unit, arc monitoring probe and current unit, etc. It provides reliable arc failure protection solution to reduce harm caused by arc accident, save lives and reduce equipment damage.(More information please refer to the manual of TV0C-2 products)

PMU intelligent distribution management unit

PMU intelligent distribution management unit is able to fulfill low end intelligent data collection to high end intelligent onsite monitoring and management function. It is able to set up communication connection with superior system via Ethernet port and is an important tool to actually realize intelligent LV switchgear cabinet.(More information please refer to the manual of PMU products)

Soft starter

The PST and PSTB series soft starter products can efficiently improve starting features of motors. PST soft starter: 30-300A

PSTB soft starter: 970-1050A with built-in bypass contactor

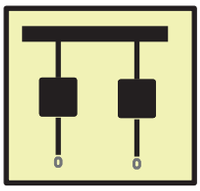
(More information please refer to the manual of soft starter products)

LV switchgear cabinet - MDmax®

Internal partitioning form

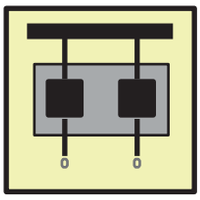
To protect human body and property safety, both GB7251-1 2005 and IEC60439-1 have defined different methods to partition LV switchgear cabinet into several compartments independently, which are called internal partitioning forms.

Use baffle or clapboard for partitioning



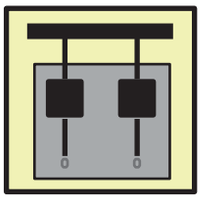
Type 1:

Without internal partitioning



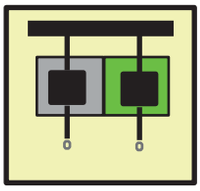
Type 2a:

The bus is isolated from functional units
The bus is not isolated from terminals



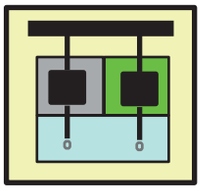
Type 2b:

The bus is isolated from functional units
The bus is isolated from terminals



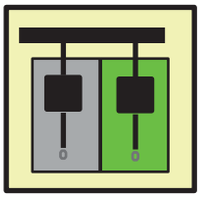
Type 3a:

The bus is isolated from functional units
Functional units are isolated from each other
The bus is not isolated from terminals



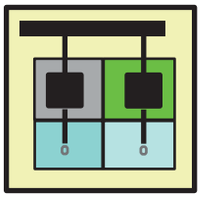
Type 3b:

The bus is isolated with functional units, terminals
Functional units are isolated from each other
Terminals are isolated with functional units



Type 4a:

The bus is isolated with functional units, terminals
Functional units are isolated from each other
Terminals connected with functional units are in same compartment



Type 4b:

The bus is isolated with functional units, terminals
Functional units are isolated from each other
Functional units and terminals are isolated from each other
Terminals are isolated from each other

LV switchgear cabinet - MDmax®

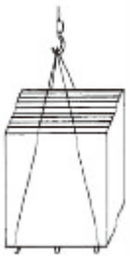
Package and transportation

Package

Switchgear cabinet shall be completely assembled and qualified by inspection before container transportation.Each container can contain one or more cabinets. But, in each transportation unit, the total net length of switchgear cabinets after joining shall not exceed 2000mm.During the transportation and intermediate storage period, proper package shall be selected to protect safety of the cabinet body.

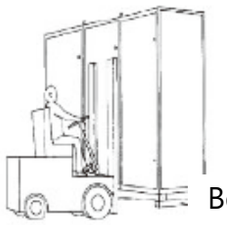
The following equipment and materials shall be packed separated with the cabinet body for transportation:

- Drawout type air circuit breaker and drawout type moulded case circuit breaker
- Fuse unit
- Transformer and electric reactor with weight bigger than 25kg
- Drawer unit with weight bigger than 100kg
- Module with single control transformer bigger than 2KVAR
- Valuable precise instrument
- Fluorescent tube
- Backup drawer



Crane transportation, transportation units are packed in container

Forklift transportation

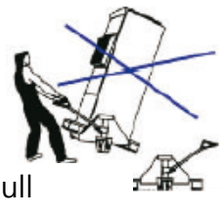


Beam

Transportation

1) The switchgear cabinet shall be handled with crane or forklift

2) On construction site, hand operated hydraulic forklift should l movement on flat ground.When transported by handcart, switchgear cabinet will easily incline; therefore the wooden tray of switchgear cabinet shall not be more than 3mm above the ground.



Hand pull transportation

3) In emergencies, rolling wood (at least 3 pcs) can be used. But weight of the switchgear cabinet shall be less than 1200kg. The body of switchgear cabinet shall be kept vertical during the transportation to avoid inclining.If door height doesn' t allow vertical transportation, single cabinet (drawer cabinet without drawer, switchgear cabinet without breaker) can be leaned to horizontal positions.In this case, the switchgear cabinet shall have one wide face to support.

Rolling wood transportation (for transportation unit with weight < 1200kg)

Transportation frame (beam 10*12mm)

4)For switchgear cabinets transported by crane, one transportation unit shall be equipped with 4 pulling outseams.Hoisting of any equipment shall not be connected on the skeleton directly. The angle of lifting rope on the position of crane hook shall not exceed 120°.

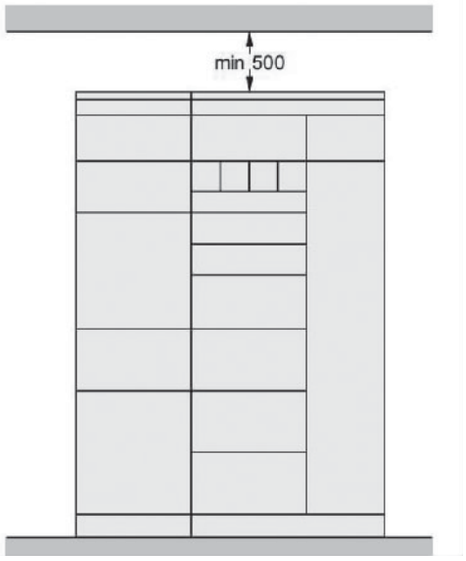
Reference table for approximate values for weight of switchgear cabinet

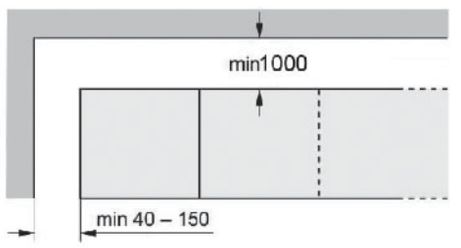
Type of switchgear cabinet	Weight of switchgear cabinet (kg)
1600A incoming cabinet (single air circuit breaker)	500
2500A incoming cabinet (single air circuit breaker)	700
4000A incoming cabinet (single air circuit breaker)	950
6300A incoming cabinet (single air circuit breaker)	1800
Drawer	600
Fixed partitioning cabinet	500

LV switchgear cabinet - MDmax®

Mounting and passage of switchgear cabinet

Switchgear cabinet shall be vertically mounted in distribution room.The distribution room shall have mounting base inside; horizontal tolerance of base shall be maintained within ±1mm/1m and shall be ensured by special level detecting instrument.After the switchgear cabinet is erected, it shall be welded or fixed with bolts on the base. Bolt fixation is limited for situations with cable duct for lower outgoing line of cable. With the consideration of bending radius and sufficient space of cables, it is suggested that height of cable duct shall be above 500mm.
Refer to the following figure for distances to walls around the switchgear cabinet





Height of cable duct shall be above 500mm

To ensure relatively easy placement of the switchgear cabinet on right, distance to wall on right of switchgear cabinets arranged in row shall be more than 600mm.