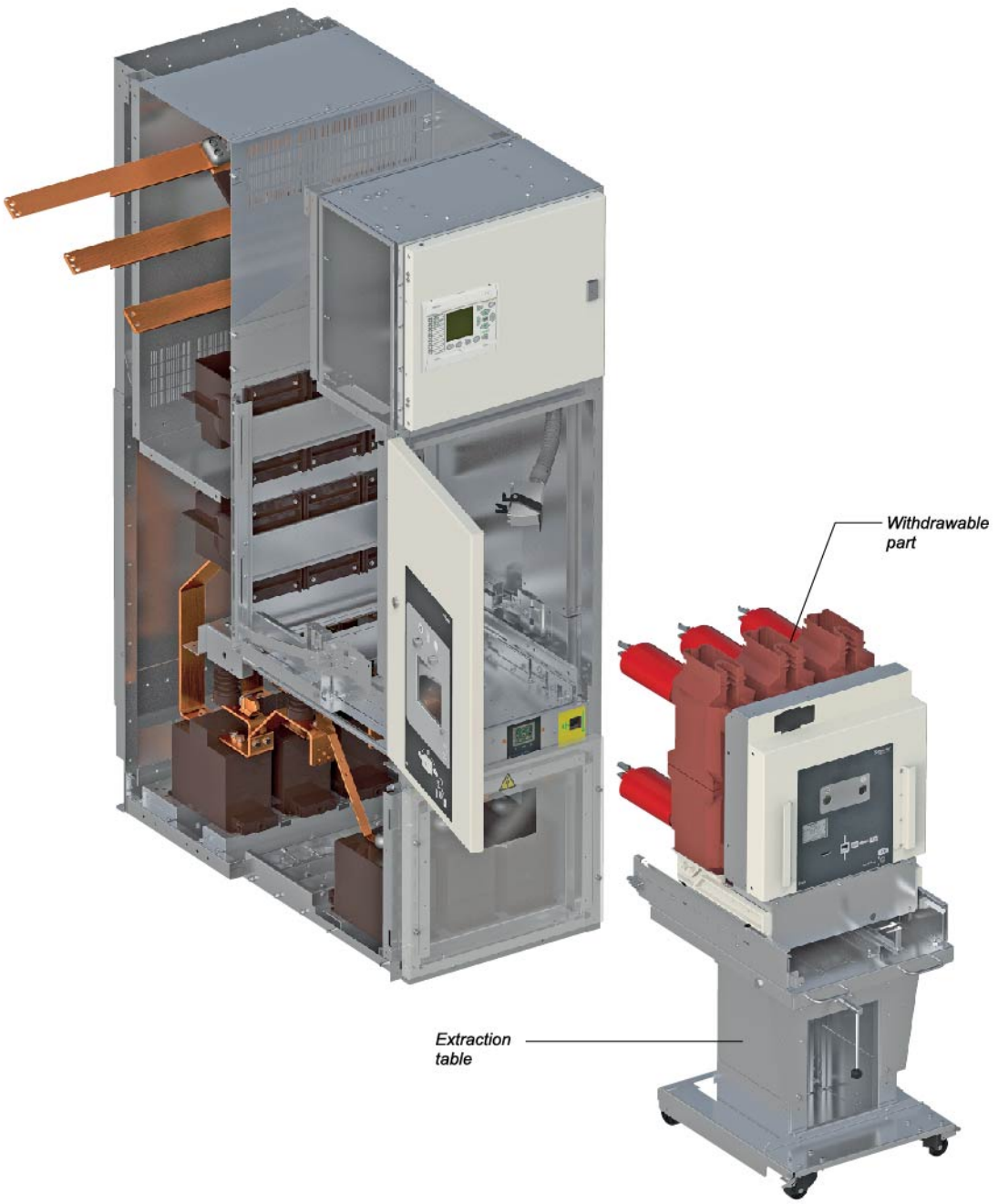
Medium Voltage Distribution

Air Insulated Switchgear up to 24 kV

PIX vacum withdrawable circuit breaker



EGEMAC
Egyptian German Electrical Manufacturing Co.

Schneider Electric

PARTNERSHIP &

LICENCE AGREEMENT

Between **The Egyptian German Manufacturing Co. S.A.E (EGEMAC)**
&
Schneider Electric Industries SAS

For the local production and sale of

PIX

This Agreement is made this November 4th, 2015 by and between:

SCHNEIDER ELECTRIC INDUSTRIES SAS, a company organised and existing in accordance with the laws of France, having its registered office at 35, rue Joseph Monier 92500 Rueil-Malmaison (France), duly represented by Mr Frédéric GODEMEL, Energy Commercial Senior Vice President, acting in its name and in the name and on behalf of its Affiliates, hereinafter referred to as the "LICENSOR"

And

The Egyptian German Manufacturing Co. S.A.E (EGEMAC), a company organised and existing in accordance with the laws of Egypt having its registered office at Kablaat Street, Mattaria, Cairo, Egypt,duly represented by Mr Medhat RAMADAN, Chairman and Managing Director, acting in its name and in the name and on behalf of its Affiliates, hereinafter referred to as the "LICENSEE".

For SCHNEIDER ELECTRIC INDUSTRIES SAS

Schneider Electric Industries SAS
Schneider Electric
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By Mr Frédéric GODEMEL
Energy Commercial Senior Vice President,
Energy Division,

For The Egyptian German Manufacturing Co. S.A.E (EGEMAC)

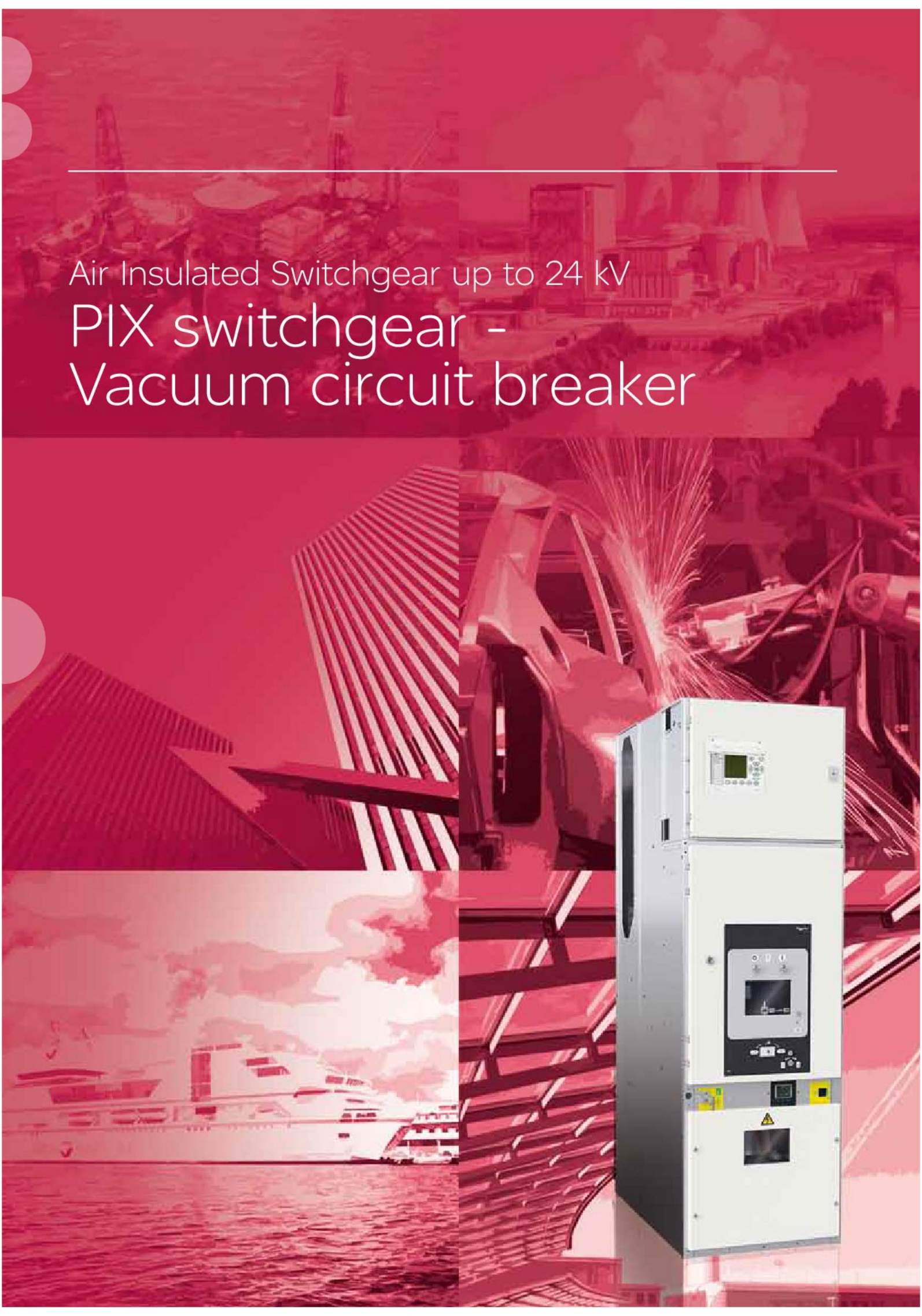
Medhat Aly

EGEMAC
Egyptian German Electrical Manufacturing Co.
P. O. Box 2634
CAIRO / A. R. EGYPT

By Mr Medhat RAMADAN
Chairman and Managing Director

Air Insulated Switchgear up to 24 kV

PIX switchgear - Vacuum circuit breaker



PIX switchgear - Vacuum circuit breaker

Description

Structure of a PIX switchboard

PIX switchboards are made up of several interconnected functional units.
Power connections are made between the functional units within a switchboard via a single busbar.
The electrical continuity of all of the metal frames is provided by the connection of each functional unit's earthing busbar to the switchboard's main earthing circuit.
Low voltage wiring trays are provided in the switchboard above the low voltage control cabinets.
LV cables can enter the switchboard through the top or bottom of each functional unit.

Description of a functional unit

A functional unit consists of all of the equipment in the main and auxiliary circuits which together provide a protection function. Each functional unit combines all of the components which are required to fulfil this function:
- The cubicle, and
- The protection, monitoring and control system (including the withdrawable live part)

Accessibility of the MV compartments

Interlock-controlled accessible compartment:
- Withdrawable MV part (circuit breaker, contactor) compartment

Tool-based accessible compartments:
- Cable compartment
- Busbar compartment
- Fixed parts compartment

The withdrawable part

The withdrawable function gives the ability to disconnect devices.
It includes:
- The circuit breaker, contactor, or the earthing truck
- The propulsion mechanism for racking in and racking out, and
- Interlocks to fix the withdrawable part either in a service or disconnecting position

The protection, monitoring and control system

This includes:
- The Sepam, MiCOM, protection, monitoring and control unit
- The GemControl monitoring and control unit
- The Vamp arc flash protection system
- Current sensors, which may be of 3 types,
  - a conventional Current Transformer
  - toroid type Current Transformers
  - LPCT type Current Transformers
- Voltage Transformers, and
- Zero sequence core balance Current Transformers (CSH type).

LSC2B
(Loss of Service Continuity IEC 62271-200):
this category defines the possibility of keeping other compartments energised (in service) when opening a main circuit compartment.

The cubicle

The cubicle is a LSC2B (Loss of Service Continuity Category) type as defined by IEC standard 62271-200; in other words, the medium voltage parts are compartmented using metal partitions (PM class) which are connected to earth and which separate:
- The busbars
- The withdrawable part (circuit-breaker, fuse-contactor, disconnector truck or earthing truck), and
- The MV connections, earthing switch, current sensors and Voltage Transformers, as required

PIX guarantees a high level of protection of people; when a compartmen containing a main circuit is open, the other compartments and/or functional units may remain energised.
The low voltage auxiliaries and monitoring unit are in a control cabinet separated from the medium voltage section.

Four basic cubicle layouts are offered:

■ Incomer or feeder	**CB**
■ Fuse-switch feeder	**T1**
■ Line-up bussection	**BC - CB**
■ Busbar metering and earthing	**MT BBE**

1 - *Busbars*
2 - *Withdrawable part*
3 - *Current Transformers*
4 - *Cables connection*
5 - *LV control cabinet*
6 - *Sepam or MiCOM relay*
7 - *Voltage Transformers*

Technical characteristics

PE58243

IAC (internal arc classification):
The metal enclosed switchgear may have different types of accessibility on the various sides of its enclosure.
For identification purposes concerning the different sides of the enclosure, the following code shall be used (according to the IEC 62271-200 standard):
A: restricted access to authorised personnel only
F: access to the front side
L: access to the lateral side
R: access to the rear side.

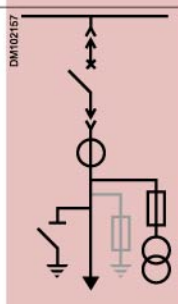
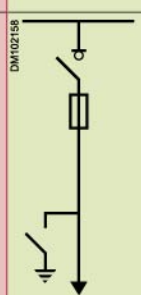
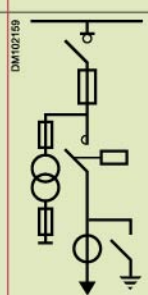
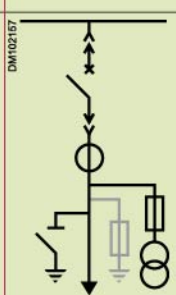
Rated voltage						
		Ur	(kV)	**12**	**17.5**	**24**
Rated insulation level						
Power frequency withstand voltage 50 Hz - 1 min		**Ud**	(kV rms)	28	38	50
Lightning impulse withstand voltage 1.2/50 µs		**Up**	(kV peak)	75	95	125
Rated normal current and maximum short time withstand current (1)						
Peak withstand current Ip (kA)			(kA rms)	63/80/100/130		50/63/80
Functional unit with circuit breaker						
Short time withstand current	Ik max.	**Ik/tk**	(kA/3 s)	25	25	20
				31.5	31.5	25
				40	40	31.5
				50	50	
Rated current	Ir max. busbar	**Ir**	(A)	up to 3150 up to 5000 (2)		up to 2500
Rated current	Ir CB	**Ir**	(A)	1250	1250	1250
				2500	2500	2500
				3150	3150	
				4000 (2)	4000 (2)	
				5000 (2)	5000 (2)	
Functional unit with switch disconnector						
Rated current			(A)	630	630	630
Functional unit with switch-fuse combination (T1 cubicle) (3)						
Rated current			(A)	400	400	400
Functional unit with fuse contactor						
Rated current			(A)	200-400		
Internal arc classification (maximum value I_A and t_A)						
			(kA/1 s)	50	50	31.5
			IAC	AFLR	AFLR	AFL
Degree of protection						
External enclosure			Standard	IP3X		
			Option	IP4X		

(1) For functional units equipped with circuit breakers or fuse-contactors, the breaking capacity is equal to the short time withstand current. In all cases, the device peak making capacity is equal to 2.5 times the short time withstand current.
(2) With fan.
(3) According to IEC 62271-105, combinations do not have a rated short time withstand current.

Functions and characteristics
Choice of functional units

PIX has a comprehensive range of functions to suit all requirements for a lot of applications.

Selection guide:
The following guide will help you to define the most appropriate protection coresponding to the type of applications you want to energize.
The equipments shown below are the main functions.
Additional functions is available upon request to answer specific requirements.

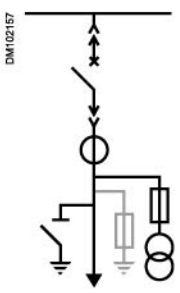
Function	**Incomer / Feeder**			**Feeder**		
	Line	Transformer	Generator	Transformer	Motor	Capacitor
Cubicle	**CB**	**CB**	**CB**	**T1**	**MCC**	**CB**
Device	Circuit breaker	Circuit breaker	Circuit breaker	Fuse-switch	Fuse contactor	Circuit breaker
Protection application	Substation	Transformer	Generator	Transformer	Motor	Capacitor
Single line diagrams						

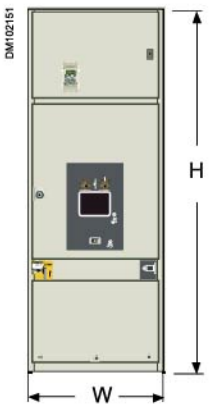
	Bussectioning		Metering and busbar earthing
	Switchboard	Switchboard	
	BC CB	**RMT**	**MT BBE**
	DM102160	DM102162	DM102161

Functions and characteristics

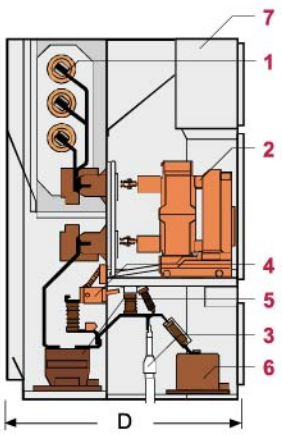
CB type cubicles
Incomer or feeder

CB

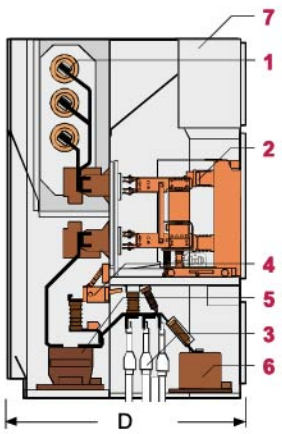




up to 2000 A



from 2500 A to 4000 A



Design of 5000 A is different please consult us.

MV devices

1 Busbars for cubicle interconnection
2 Main switching device
3 MV connections by cables accessible from the front face
4 Earthing switch
5 Current sensors
6 Voltage Transformers

LV control cabinet

7 Low voltage auxiliaries and the protection, monitoring and control unit are in a control cabinet which is separated from the medium voltage part

Options

- □ VT's with fuses
- □ Withdrawable cable VT's with removable fuses
- □ Fixed VT's without fuses
- □ Surge arresters
- □ Earthing switch motorisation

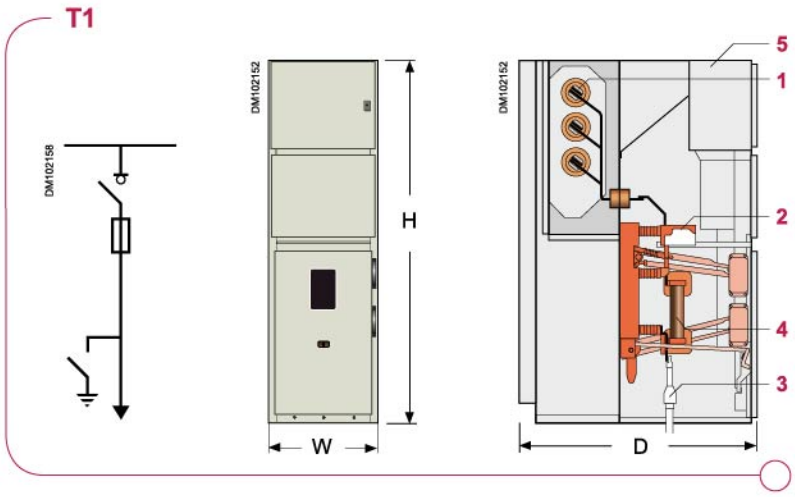
Characteristics

			CB 12				CB 17				CB 24	
Rated voltage	kV		12				17.5				24	
Breaking capacity	kA		25	31.5	40	50	25	31.5	40	50	25	31.5
Rated current	A											
Vacuum circuit breaker		630	■ (1)	■ (1)	■ (1)	■ (3)	■ (2)	■ (2)	■ (2)	■ (3)	■ (3)	■ (3)
		1250	■ (1)	■ (1)	■ (1)	■ (3)	■ (2)	■ (2)	■ (2)	■ (3)	■ (3)	■ (3)
		1600	■ (3)	■ (3)	■ (3)	■ (3)	■ (2)	■ (2)	■ (2)	■ (3)	■ (3)	■ (3)
		2000	■ (3)	■ (3)	■ (3)	■ (3)	■ (2)	■ (2)	■ (2)	■ (3)	■ (4)	■ (4)
		2500	■ (4)	■ (4)	■ (4)	■ (3) (4)	■ (4)	■ (4)	■ (4)	■ (3) (4)	■ (4)	■ (4)
		3150	■ (4)	■ (4)	■ (4)	■ (4)	■ (4)	■ (4)	■ (4)	■ (4)		
		4000 (*)	■ (4)	■ (4)	■ (4)	■ (4)	■ (4)	■ (4)	■ (4)	■ (4)		
		5000 (*)	■ (4)	■ (4)	■ (4)	■ (4)	■ (4)	■ (4)	■ (4)	■ (4)		
Short-circuit making current **Ip**	Peak value kA	50 Hz	63	80	100	100 / 125 (**)	63	80	100	100 / 125 (**)	63	80
		60 Hz	65	80	104	100 / 125 (**)	65	80	104	100 / 125 (**)	65	82
	s	Duration	3	3	3	3	3	3	3	3	3	3
Dimensions	mm	H	2130			2330 (***)	2200			2330 (***)	2330	
		D	1405		1605	1590	1505		1605	1590	1605/1805	
Approximate mass	kg		820			Max. 1900	850			Max. 1900	870	

(*) With forced ventilation for 4000 A and 5000 A.
(**) Higher values on request.
(***) With LV cabinet 2330 mm, with fan 2800 mm, with gas duct 3100 mm.
(1) Width: 650 mm. (2) Width: 750 mm. (3) Width: 800 mm. (4) Width: 1000 mm.

Functions and characteristics

T1 type cubicles
Fuse-switch feeder



MV devices

1 Busbars for cubicle interconnection
2 Switch disconnector
3 MV connections by cables accessible from the front face
4 Fuses

LV control cabinet

5 Low voltage auxiliaries and the protection, monitoring and control unit are in a control cabinet which is separated from the medium voltage part

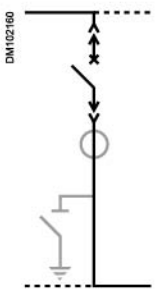
Characteristics

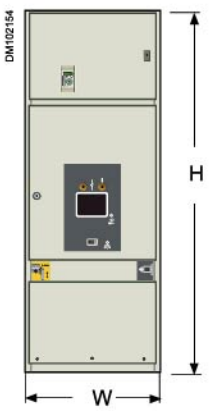
					T1 12	T1 17	T1 24
Rated voltage				kV	12	17.5	24
Insulation level	Insulation	**Ud**	50/60 Hz - 1 min	kV rms	28	38	50
	Isolation	**Ud**	50/60 Hz - 1 min	kV rms	32	45	60
	Insulation	**Up**	1.2/50 µs	kV peak	75	95	125
	Isolation	**Up**	1.2/50 µs	kV peak	85	110	145
Rated current			A				
With fuses				200	■	■	■
Without fuses				630	■	■	■
Short-circuit making current		**Ip**	Peak value kA	50 Hz	63	63	63
				60 Hz	63	63	63
Dimensions			mm	H	2130	2200	2330
				W	650	750	800
				D	1405/1605	1505/1605	1605/1805
Approximate mass			kg		600	650	750

Functions and characteristics

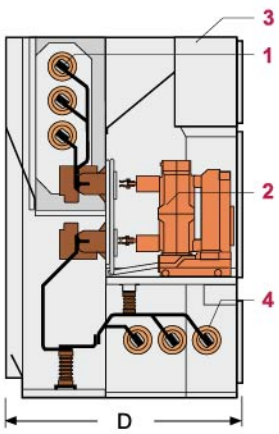
BC CB type cubicles
Line-up bussectioning

BC CB (left or right coupling)

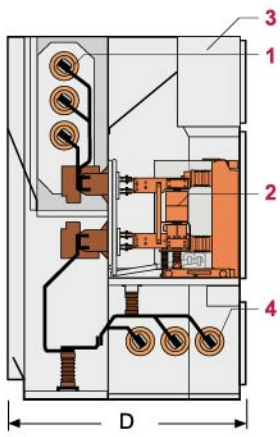




up to 2000 A



from 2500 A to 4000 A



Design of 5000 A is different please consult us.

MV devices

1 Busbars for cubicle interconnection
2 Main switching device
4 Busbars for cubicle interconnection with bus riser (right or left coupling)

LV control cabinet

3 Low voltage auxiliaries and the protection, monitoring and control unit are in a control cabinet which is separated from the medium voltage part

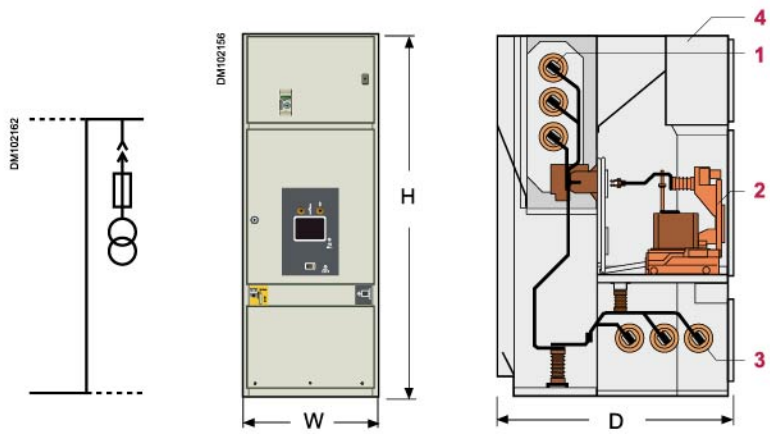
Characteristics

			BC CB 12				BC CB 17				BC CB 24	
Rated voltage	kV		12				17.5				24	
Breaking capacity	kA		25	31.5	40	50	25	31.5	40	50	25	31.5
Rated current	A											
Vacuum circuit breaker		630	■ (1)	■ (1)	■ (1)	■ (3)	■ (3)	■ (3)	■ (3)	■ (3)	■ (3)	■ (3)
		1250	■ (1)	■ (1)	■ (1)	■ (3)	■ (3)	■ (3)	■ (3)	■ (3)	■ (3)	■ (3)
		1600	■ (3)	■ (3)	■ (3)	■ (3)	■ (3)	■ (3)	■ (3)	■ (3)	■ (3)	■ (3)
		2000	■ (3)	■ (3)	■ (3)	■ (3)	■ (3)	■ (3)	■ (3)	■ (3)	■ (4)	■ (4)
		2500	■ (4)	■ (4)	■ (4)	■ (3) (4)	■ (4)	■ (4)	■ (4)	■ (3) (4)	■ (4)	■ (4)
		3150	■ (4)	■ (4)	■ (4)	■ (4)	■ (4)	■ (4)	■ (4)	■ (4)		
		4000 (*)	■ (4)	■ (4)	■ (4)	■ (4)	■ (4)	■ (4)	■ (4)	■ (4)		
		5000 (*)	■ (4)	■ (4)	■ (4)	■ (4)	■ (4)	■ (4)	■ (4)	■ (4)		
Short-circuit making current **Ip**	Peak value kA	50 Hz	63	80	100	100 / 125 (**)	63	80	100	100 / 125 (**)	63	80
		60 Hz	65	80	104	100 / 125 (**)	65	80	104	100 / 125 (**)	65	82
	s	Duration	3	3	3	3	3	3	3	3	3	3
Dimensions	mm	H	2130			2330 (***)	2200			2330 (***)	2330	
		D	1405		1605	1590	1505		1605	1590	1605/1805	
Approximate mass	kg		820			Max. 1900	850			Max. 1900	870	

(*) With forced ventilation for 4000 A and 5000 A.
(**) Higher values on request.
(***) With LV cabinet 2330 mm, with fan 2800 mm, and gas duct 3100 mm.
(1) Width: 650 mm. (2) Width: 750 mm. (3) Width: 800 mm. (4) Width: 1000 mm.

Functions and characteristics
RMT type cubicles
Bus riser

RMT (left or right coupling)



MV devices
1 Busbars for cubicle interconnection
2 Withdrawable Voltage Transformer
4 Busbars for cubicle interconnection with bus riser (right or left coupling)

LV control cabinet
3 Low voltage auxiliaries and the protection, monitoring and control unit are in a control cabinet which is separated from the medium voltage part

Options
□ Voltage Transformers

Characteristics

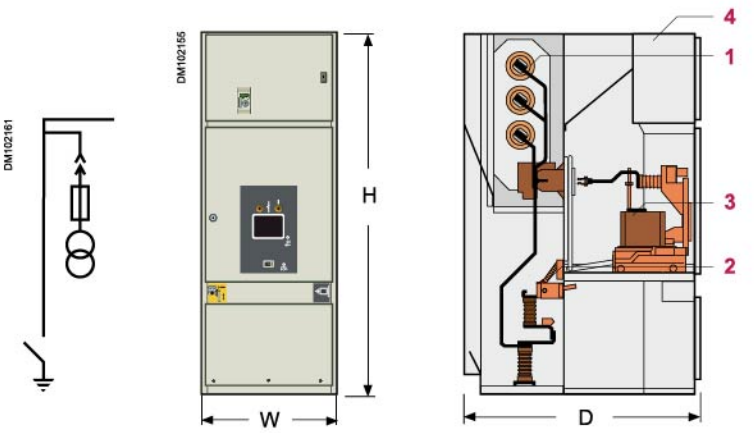
			RMT 12				RMT 17				RMT 24	
Rated voltage	kV		12				17.5				24	
Breaking capacity	kA		25	31.5	40	50	25	31.5	40	50	25	31.5
Rated current	A											
Vacuum circuit breaker		630	■ (1)	■ (1)	■ (1)	■ (3)	■ (2)	■ (2)	■ (2)	■ (3)	■ (3)	■ (3)
		1250	■ (1)	■ (1)	■ (1)	■ (3)	■ (2)	■ (2)	■ (2)	■ (3)	■ (3)	■ (3)
		1600	■ (3)	■ (3)	■ (3)	■ (3)	■ (2)	■ (2)	■ (2)	■ (3)	■ (3)	■ (3)
		2000	■ (3)	■ (3)	■ (3)	■ (3)	■ (2)	■ (2)	■ (2)	■ (3)	■ (4)	■ (4)
		2500	■ (4)	■ (4)	■ (4)	■ (3) (4)	■ (4)	■ (4)	■ (4)	■ (3) (4)	■ (4)	■ (4)
		3150	■ (4)	■ (4)	■ (4)	■ (4)	■ (4)	■ (4)	■ (4)	■ (4)		
		4000 (*)	■ (4)	■ (4)	■ (4)	■ (4)	■ (4)	■ (4)	■ (4)	■ (4)		
		5000 (*)	■ (4)	■ (4)	■ (4)	■ (4)	■ (4)	■ (4)	■ (4)	■ (4)		
Dimensions	mm	H	2130			2330 (***)	2200			2330 (***)	2330	
		D	1405		1605	1590	1405		1605	1590	1605/1805	
Approximate mass	kg		820			Max. 850	730			Max. 850	750	

(***) With LV cabinet 2330 mm, fan 2800 mm, and gas duct 3100 mm.
(1) Width: 650 mm. (2) Width: 750 mm. (3) Width: 800 mm. (4) Width: 1000 mm.

Functions and characteristics

MT BBE type cubicles
Metering - Busbar earthing

MT BBE



MV devices

1 Busbars for cubicle interconnection
2 Withdrawable Voltage Transformers

LV control cabinet

3 Low voltage auxiliaries and the protection, monitoring and control unit are in a control cabinet which is separated from the medium voltage part

Options

2 Earthing switch
□ Fixed Voltage Transformers

Characteristics

			MT BBE 12		MT BBE 17		MT BBE 24
Rated voltage	kV		12		17.5		24
Breaking capacity	kA		40	50	40	50	31.5
Rated current	A						
		630	■	■	■	■	■
		1200	■		■		■
Dimensions	mm	H	2130	2330 (***)	2200	2330 (***)	2330
		W	650	800	750	800	800
		D	1405/1605	1590	1405/1605	1590	1605/1805
Approximate mass	kg		600	750	650	750	700

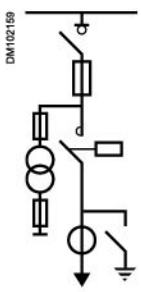
(***) With LV cabinet 2330 mm and gas duct 3100 mm.

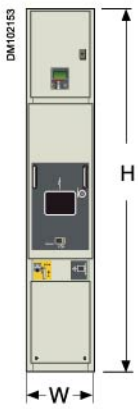
Functions and characteristics
Motor Control Center
Contactor feeder

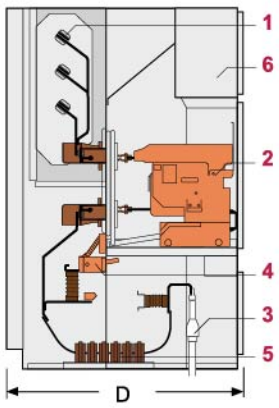
With today's large and medium-sized industrial installations using MV motors to drive their plants, the controlgear must provide maximum reliability and minimum down time.
To meet these specific requirements, PIX MCC supplements our PIX switchgear range.

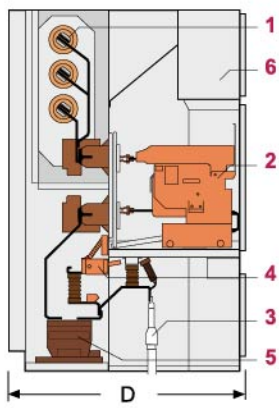
The PIX Motor Control Center is a slimline design which lines up directly with the PIX range without interface cubicles. The design philosophy and operation are similar to the PIX switchgear range, helping reduce training time and minimize the risk of improper use.
The combination of PIX & PIX MCC provides the total solution for power plants, process plants and Oil & Gas applications.

MCC









MV devices
1 Busbars for cubicle interconnection
2 Withdrawable fused contactor
3 MV connections by cables accessible from the front face
4 Earthing switch
5 Current Transformers

LV control cabinet
6 Low voltage auxiliaries and the protection, monitoring and control unit are in a control cabinet which is separated from the medium voltage part

Options
- ☐ Voltage Transformers
- ☐ Rear top/bottom cable entry
- ☐ Control voltage transformer (up to 7.2 kV)

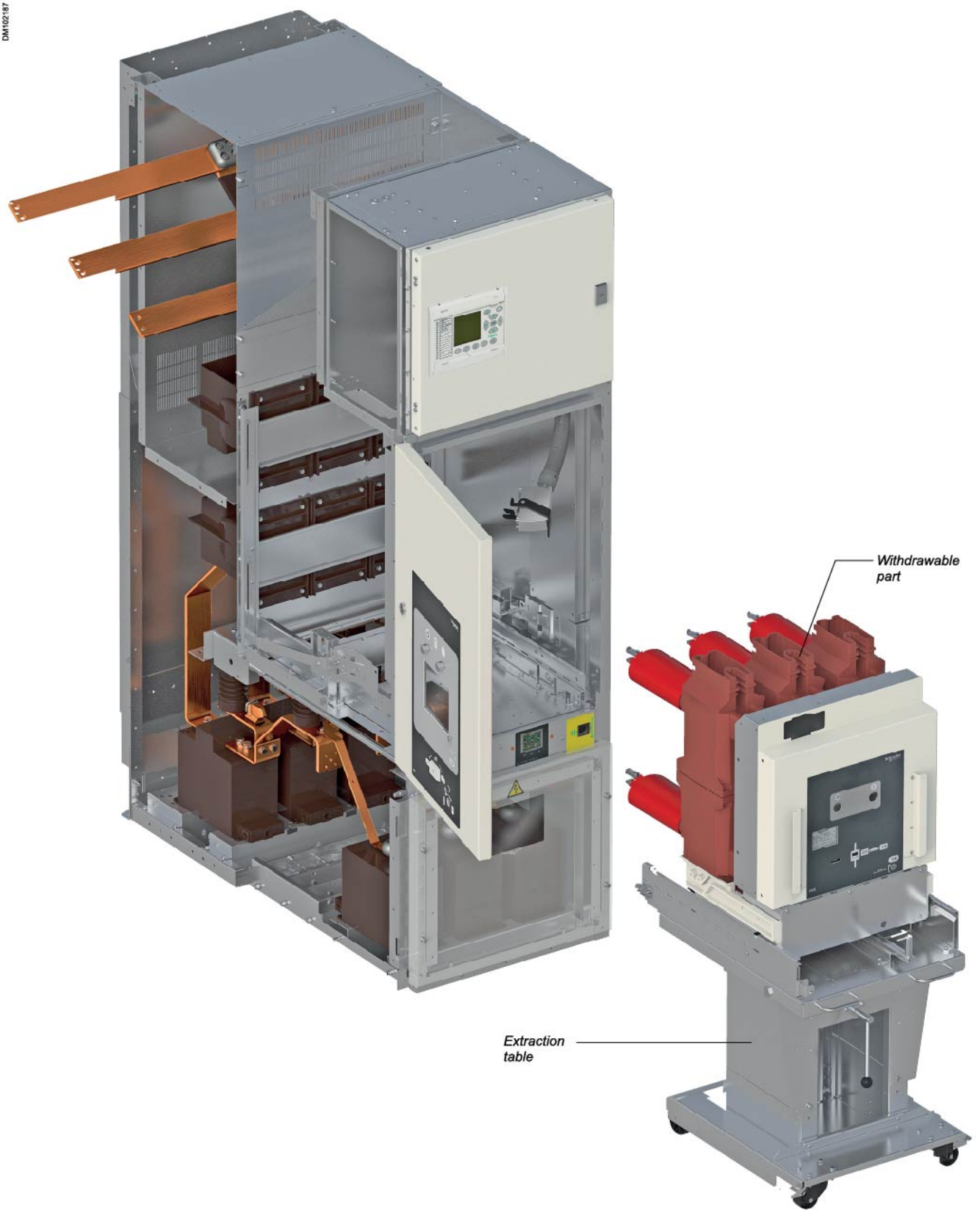
Characteristics

			MCC 7		MCC 12
Rated voltage	kV		7.2		12
Breaking capacity	kA		40	50	40
Rated current	A				
		195			■
		270	■	■	
Current transformer type					
	Din (block)*				■
	Ring**		■	■	
Busbar segregation (Optional)* **					■
Dimensions	mm	H	2130	2130	2130
		W	400	400	650
		D	1405/1605	1590	1405/1605
Approximate mass	kg		700	700	700

(*) DIN CT's are only available on the 12 kV cubicle (it is a standard PIX cubicle)
(**) Ring type CT's are only available on the PIX MCC 7.2 kV 400 mm wide cubicles
(***) Bus bar segration is only available on 650 mm wide cubicles as an option

Switchgear / Apparatus
PIX design

DM1021187



The devices used to equip the PIX range of functional units have outstanding features:
b Long service life
b Maintenance-free live parts
b High electrical endurance
b Operating safety
b Insensitivity to the environment

The withdrawable parts:
b The circuit breaker, contactor or switch disconnector, the disconnector truck or the earthing truck
b The lever-type propulsion mechanism for racking in-out
b Interlocks to fix the withdrawable parts onto the fixed part
The live parts are housed in an insulating enclosure in the sealed pressure system in compliance with IEC 62271-100.

Circuit breaker

A circuit breaker is a safety device enabling the switching and protection of electrical distribution networks. Installed in the PIX cubicle, it protects all components situated downstream during a short-circuit.
■ Breaking in vacuum
□ HVX

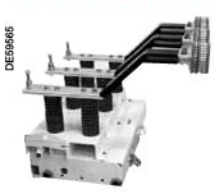
Contactor

The contactor is a motor control and protection device.
■ Breaking in vacuum.
□ CVX withdrawable part of the contactor
□ CBX contactor

Switch disconnectors

The air switch disconnector have making capacity and are suitable for switching:
■ Load currents
■ Currents in ring mains
■ Transformers, cables and overhead lines
□ L-TRI 5

Earthing truck



The earthing truck is a safety feature. It enables the injection of voltage for testing either of the earthing of the busbar or of the cables. It is installed instead of the circuit breaker and has the same interlock capabilities.

Disconnector truck

The disconnector truck enables the upper and lower part of the cubicle to be short-circuited. It is installed instead of the circuit breaker and has the same interlock capabilities.

Metering device

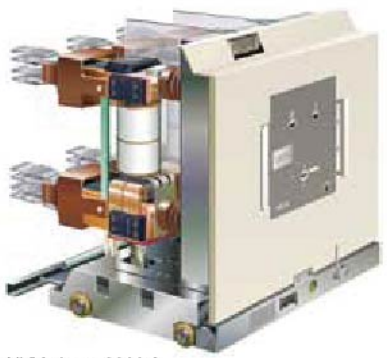
Withdrawable metering unit.
v MTX

Switchgear / Apparatus
HVX circuit breaker
Presentation - Characteristics

PE58245

HVX up to 2000 A

PE58246



HVX above 2000 A

Description of the device

HVX is our latest range of vacuum circuit breakers. It offers a proven state-of-the-art design to meet your specifications for power switching devices in air-insulated switchgear up to 36 kV. HVX brings a valuable solution to your project.
Thanks to its improved contact design, our interrupters provide unrivalled performance for their reduced size.

Operating mechanisms have been simplified to increase reliability and give extended life with very low maintenance. Instead of the traditional spring operating mechanism, HVX implemented a singleshaft system with only one torsion spring, reducing the number of parts and increasing the reliability.

Application

HVX is designed to suit all types of applications (utilities, power generation, O&G, industry, etc.) and for breaking short-circuit as well as transformers (under load and no-load conditions), generators, capacitor banks and motors.

Flexibility

HVX is available in a range of standard, fixed or withdrawable configurations, with plug-in (finger or tulip type) or bolted connections.

HVX can be integrated in our medium voltage switchboard PIX or can be offered with a pre-engineered power module which incorporates a chassis with metal shutters, earthing switch, mechanical interlocks, multi-functional bushings and various electrical options to facilitate switchboard integration.

Standard

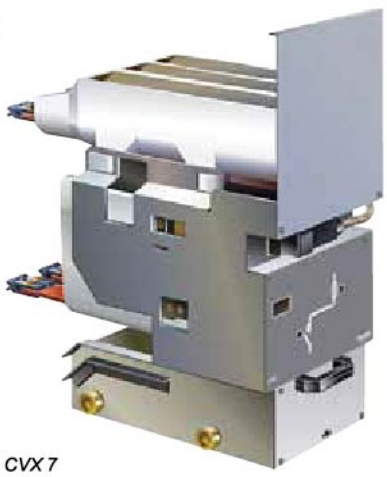
HVX has been fully tested according to IEC 62271-100 at 50 Hz and 60 Hz and the latest GOST standards. The highest level of the above mentioned standards has been passed including M2, E2, C2.

HVX has also been certified to ANSI C37.013 for generator circuit breaker applications up to 25 kA.

Electrical characteristics according to IEC 62271-100					
For the cubicles			**PIX 12**	**PIX 17**	**PIX 24**
Circuit breaker designation			**HVX 12**	**HVX 17**	**HVX 24**
Rated voltage		kV	12	17.5	24
Rated current		A rms	Up to 3150	Up to 3150	Up to 2500
Rated breaking capacity					
	Short circuit current	kA rms	16/25/31.5/40	25/31.5/40	16/25/31.5
	Cable charging current	A	25	31.5	31.5
	Line charging current	A	10	10	
	Single capacitor bank	A	400	400	
	No load transformer	A	10	10	
Rated making capacity		kA peak	40/63/80/100	63/80/100	40/63/80
Rated operating time					
	Opening	ms	40-47	40-47	40-47
	Breaking	ms	55-62	55-62	55-62
	Arcing	ms	2-15	2-15	2-15
	Closing	ms	50-58	50-58	50-58
Rated operating sequence		O-3 min-CO-3 min-CO	■	■	■
		CO-15 s-CO	■	■	■
		O-0.3 s-CO-3 min-CO	■	■	■
		O-0.3 s-CO-15 s-CO	■	■	■
Endurance					
	Mechanical (C/O) for switching chamber		30000	30000	30000
	Mechanical (C/O) for mechanism		10000	10000	10000
	Electrical (C/O at In up to 3150 A)		10000	10000	10000

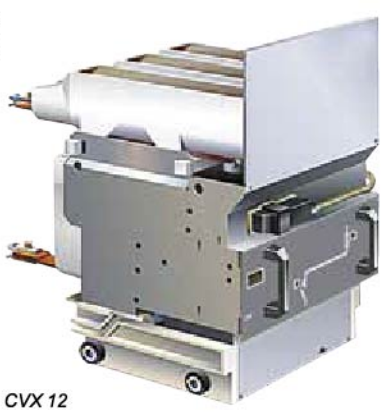
Switchgear / Apparatus
CVX contactor
Presentation - Characteristics

PE90531



CVX 7

PE90532



CVX 12

Withdrawable fuse vacuum contactor CVX for PIX switchgear
Description

The CVX fused vacuum contactor has been specifically developed for switching motors, transformers or capacitive loads.

- 3 phase or single phase
- Magnetic holding or mechanical latch
- Electronic auxiliary supply to allow a wide range of control voltages
- High endurance
- Excellent capacitive switching perfomance

Application

- Starting and protection of medium voltage motors
- Single and back-to-back capacitor banks
- Transformer neutral earthing
- Arc furnaces

Ratings

Up to 40 kA (50 kA for CVX 7) in conjunction with fuses

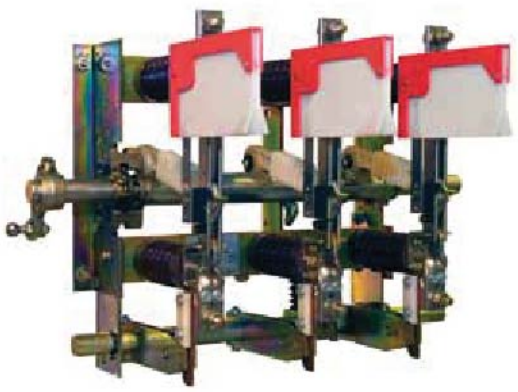
Standard

IEC, GB (chinese) standards

Electrical characteristics				
For the cubicles			**PIX 7**	**PIX 12**
Mobile part designation			**CVX 7**	**CVX 12**
Contactor designation			**CBX**	**CBX**
Category			AC3 - AC4	AC3 - AC4
Rated voltage		kV	7.2	12
Rated current		A rms	400	400
Maximum motor rated current		A	320	160
Rated breaking capacity				
	Short circuit current with fuses	kA rms	40/50	40
	Short circuit current without fuses	A rms	6	4
	Single capacitor bank	A	280	160
Rated making capacity with fuses		kA peak	100	100
Rated making capacity without fuses		kA peak	15	10
Rated operating time				
	Opening with DC magnetic holding control	ms	60 to 100	60 to 100
	Opening with AC magnetic holding control	ms	90 to 120	90 to 120
	Opening with mechanical latch control	ms	20 to 30	20 to 30
	Closing	ms	60 to 100	60 to 100
Rated operating sequence number		Per hour	1200	1200
Endurance				
	Mechanical with magnetic holding (C/O)		3 000 000	3 000 000
	Electrical with mechanical latch (C/O)		200 000	200 000
	Electrical (C/O at 400 A)		500 000	500 000
	Electrical (C/O at 250 A)		1 000 000	1 000 000
	Electrical (breaking at Icc 3.2 kA)		25	25
	Electrical (making at Icc 4 kA)		100	100

Switchgear / Apparatus
L-TRI air switch disconnector for PIX

PM103211



Transformer disconnector L-TRI 5F

Description

L-TRI 5 switch disconnectors are designed for use in indoor medium-voltage switchgear systems.

The L-TRI 5 range of switch disconnectors, incorporating proven flat-chamber arcing technology, can perform a wide variety of switching functions in medium-voltage distribution systems.

The simple, low-maintenance and highly economic indoor switch disconnectors in the L-TRI 5 range have a proven service record, with hundreds of thousands of units installed and operating on a wide range of systems.

Conformity to standards

L-TRI 5 switch disconnectors comply with the requirements of IEC 60694 (EN 60694) and IEC 60265-1 (EN 60265-1).

L-TRI 5F additionally, selected variants are available, complying with IEC 62271-105.

Electrical characteristics		L-TRI 5			L-TRI 5F	
Type		**Fuse switch-disconnector**			**Switch-disconnector fuse combination**	
Rated voltage	kV	**12**	**17.5**	**24**	**12**	**24**
Rated current	A	400/630			200 (1)	
Rated short-time current	kA 1 s	25			16	
	kA 3 s	18			–	
Rated peak current	kA	63			40	
Rated short-circuit making current	kA	63			40	
Mechanical operations	n	1500			1500	

(1) In general, the rated current of a switch disconnector fuse combination is lower than the rated current specified by the fuse manufacturer

Installation

Accessories and extraction withdrawable parts

Door locking key

DM102178

Handle switching compartment

DM102177

Earthing switch operating lever

DM102176

Plug in handle

DM102174

Circuit breaker mechanism reset handle

DM102175

L-TRI isolating sheet

DE59589

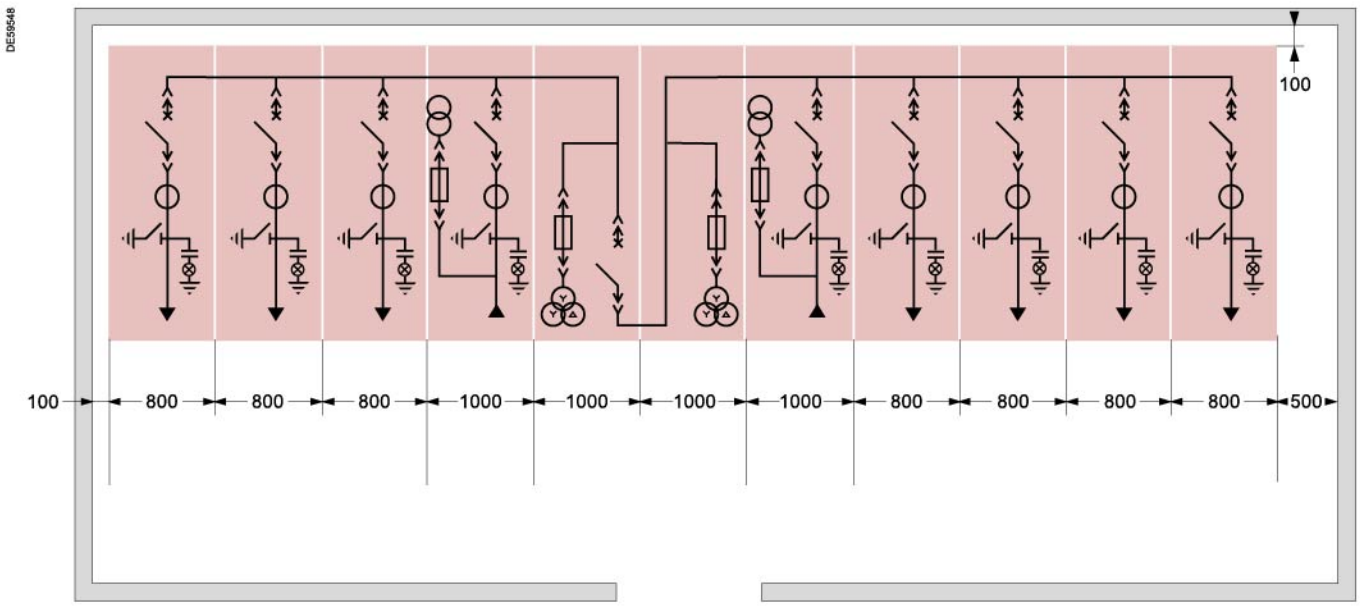
Handling trolley

DM102188

Installation

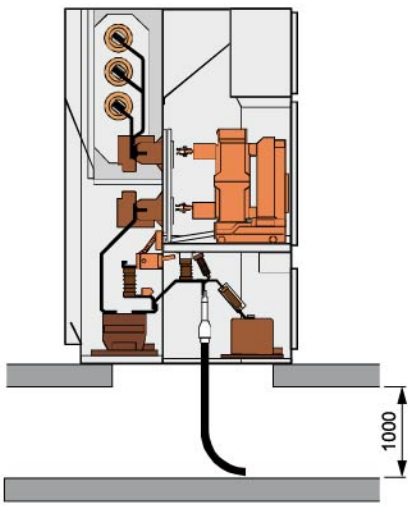
Implementation example
PIX 24 kV line-up switchboard

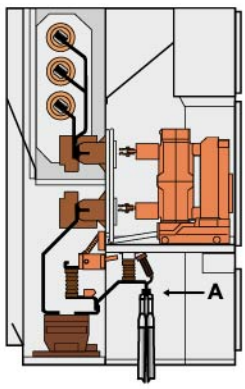
Line-up switchboard
(2 supply cubicles and 1 bussection at 24 kV)



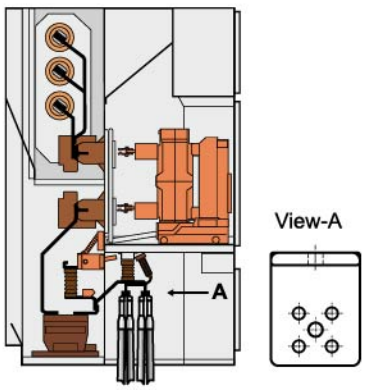
PIX width 650, 750 and 800 mm

DE59650





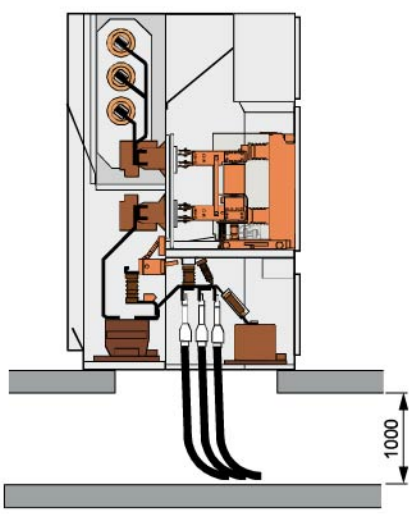
- 1 x cable per phase
- 2 x cable per phase

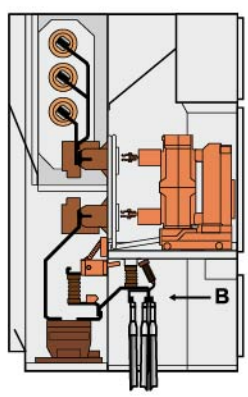


- 3 x cable per phase
- 4 x cable per phase

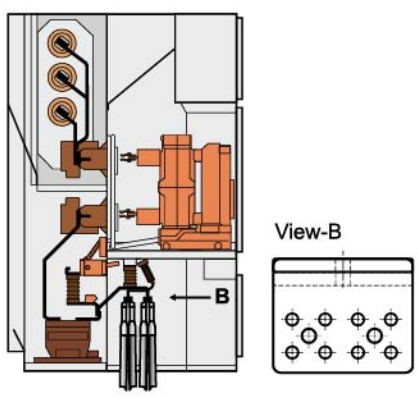
PIX width 1000 mm

DE59651





- 2 x cable per phase
- 4 x cable per phase
- 6 x cable per phase



- 8 x cable per phase

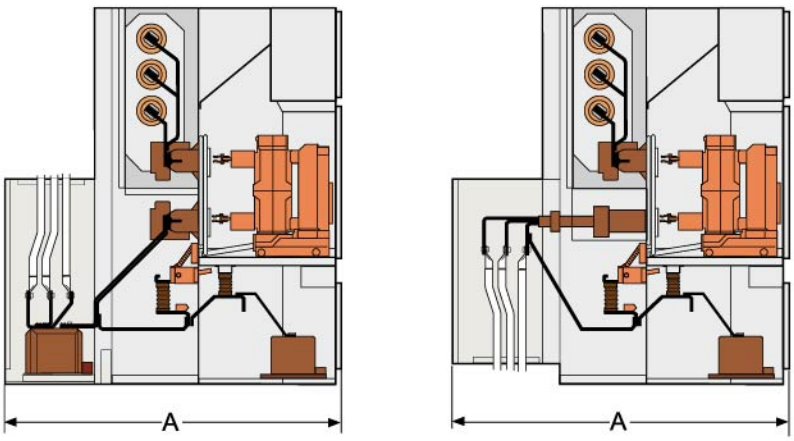
Standard cable connection: maximum size and number per phase

Functions	12 kV Width (mm)	12 kV Cable max. (no. x size) (1)	17.5 kV Width (mm)	17.5 kV Cable max. (no. x size)	24 kV Width (mm)	24 kV Cable max. (no. x size)
CB incoming/outgoing Direct incoming	650	4 x 630	750	4 x 630	800	4 x 630
	800	4 x 630	1000	6 x 630 (3)	1000	6 x 630 (3)
	1000	8 x 630	–	–	–	–
Switch-disconnector without fuse (LTRI)	650	1 x 630	750	1 x 630	800	1 x 630
Switch-disconnector with fuse (LTRI)	650	1 x 95	750	1 x 95	800	1 x 95
Contactor: CVX 12 (2)	650	2 x 240	–	–	–	–

(1) Cable size is the cross sectional area in mm² based on a single core cable.
(2) For PIX 7.2 kV with CVX, see PIX-MCC.
(3) 8 cables are subject to customisation.

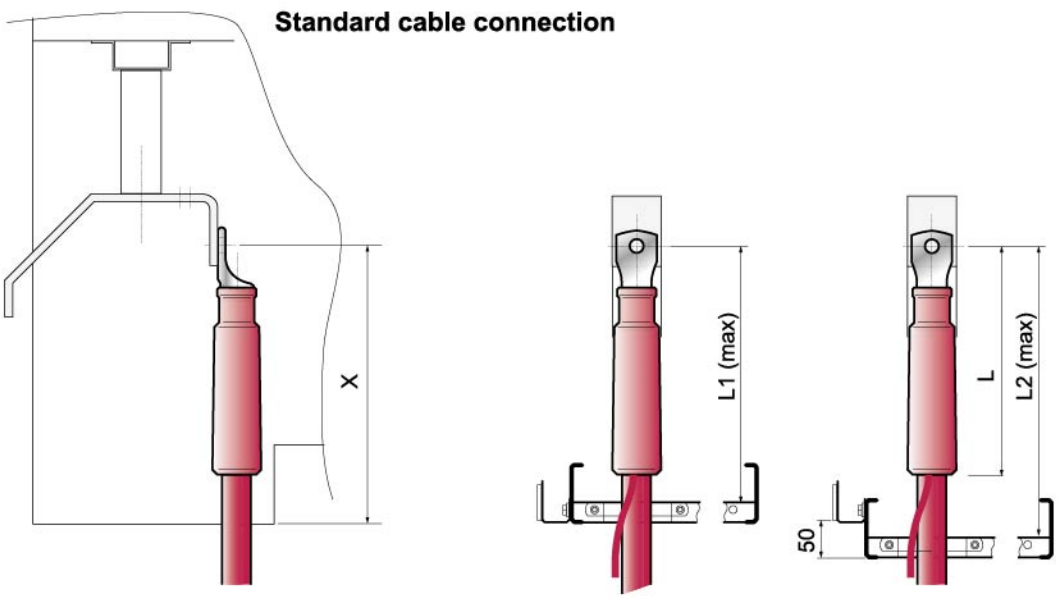
Installation
Connections

PIX rear cable box top and bottom entry



Maximum 6 cables per phase (630 mm²).
Maximum 2 cables per phases (1200 mm²).
Depth A on demand.

Standard cable connection



Note: position of the standard cable floor and clamp can be adjusted 50 mm deeper during installation if necessary.

Dimensions (mm)	PIX 12	PIX 17	PIX 24
X	430	460	555
L1	400	430	525
L2	450	480	575

Cubicle equipment

Equipment			Type of cubicle						
			CB	MCC 12	MCC 7	BC CB + RMT	BC CB + RMT	MT BBE	T1
Switchgear									
Circuit-breaker			■			■			
Contactor				■	■				
Fuse switch									■
Disconnector truck			■	■	■	■			
Earthing truck			□	□	□	□			
Fixed busbars							■	■	
Racking position indication contact for the withdrawable part		4 NO + 4 NC	■			■	■		
		2 NO + 2 NC		■	■				
Padlocking of isolating shutters for withdrawable parts			■	■	■	■			
Locking of withdrawable part/cable compartment			□	□	□	□			
Disabling of circuit-breaker operating mechanism			□			□			
Voltage present indicator			■	■	■	■	■	■	■
Locking of mechanical racking of the withdrawable part (padlock)			■	■	■	■			
Locking of mechanical racking of the withdrawable part (keylock)			□	□	□	□			
Locking of the electromagnetic racking of the withdrawable part			□	□	□	□			
Earthing switch (SMALT)									
Earthing switch			□	□	□	□	□	□	□
Earthing switch position indication contacts		4 NO + 4 NC	□ (1)	□ (1)	□ (1)	□ (1)	□ (1)	□ (1)	□
Earthing switch position key locking			□	□	□	□	□	□	□
Electromagnetic earthing switch position locking			□	□	□	□	□	□	
Transformers									
Voltage Transformers (1 per phase)	Without fuse	Phase-phase							
		Phase-earth	□	□		□	□	□	
	With plug-in fuses	Phase-phase							
		Phase-earth	□	□		□	□	□	
Fuse melting indication contact		1 NO							
Current Transformer	Single set	3 CT's	■	■		□	□		
	Double set	6 CT's	□	□					
	LV toroid transformer CT (3)		□						
Connections									
Connection with cable terminal height > 460 mm			■	■	■				■
Connection from top bar			□	□	□				
Connection by cable from the top			□	□	□				
Connection by cable from the bottom			■	■	■				■
Cubicle									
Protection index (6)	Enclosure	IP3X	■	■	■	■	■	■	■
		IP4X	□	□	□	□	□	□	□
		IPX1							
		IPX2							
	Compartments (4)	IP2XC	■	■	■	■	■	■	■
Anti-arcing protection (2)		25 kA - 1 s	□	□	□	□	□	□	□
		31.5 kA - 1 s	□	□	□	□	□	□	
		40 kA - 1 s	□	□	□	□	□	□	
		50 kA - 1 s							
Thermal diagnosis system (6)			□	□	□	□	□	□	
Lightning arrester			□	□	□			□	
Busbars									
1250 A / 2500 A / 3150 A / 4000 A (5)		Exposed	■	■	■	■	■	■	■
		Insulated	□	□	□	□	□	□	□
LV control cabinet key locking			□	□	□	□	□	□	□
LV control cabinet lighting			□	□	□	□	□	□	□
Anti-condensation heating element			□	□	□	□	□	□	□

■: *basic equipment.*
□: *option.*
(1) Basic equipment with earthing switch option.
(2) According to the room in which the PIX switchboard is installed, you can choose an option for 3 or 4 sides, and possibly an exhaust tunnel for hot gases (see page E-9).
(3) Connection of 1 or 2 cables per phase.
(4) Compartment protection.
(5) For 4000 A equipped with fans.
(6) Consult us.

Notes

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