MTW

Medium Voltage Switchgear and Motor Control Centers





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Developed for the *various market segments*, WEG electric panels meet the highest *quality and performance* requirements, being designed with a high standardization rate. They offer simple assembly, installation, maintenance, future expansions and interchangeability.

The products are factory assembled and tested for 2.3 kV to 36 kV voltages and were developed to meet the requirements of 62271-200 standard, while preserving the flexibility in adapting to the different characteristics demanded by the market.



INTEGRAL ENERGY MANAGEMENT



Applications

The switchgear have a wide range of applications in medium voltage systems, the main ones being:

- Utility substations
- Main factory and industrial facility protection and sectioning
- Pumping stations
- Power generation thermal and hydroelectric plants
- Medium voltage motor start
- Unitary substations
- Power distribution systems

Segments

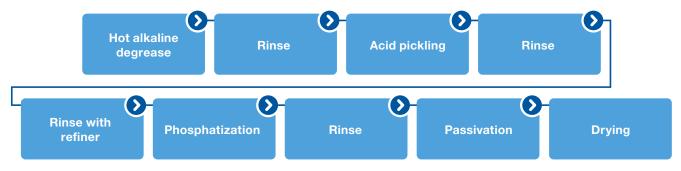




Construction Characteristics

The MTW medium voltage switchgear is a medium voltage switchgear with a metal enclosure, which undergo an alkaline degrease treatment, phosphatization and powder painting. Overpressure relief devices on top or side provide pressure relief in case of internal arc. The general bus consists of one or more rectangular bars in electrolytic copper with tin plated fittings and dimensioned in such a way to withstand the thermal and dynamic efforts. The low voltage compartment is located in the upper front part. This compartment houses the measurement instruments, protection, terminals, thermostats, auxiliary contactors, etc., and it is completely isolated from the medium voltage compartment by means of a steel plate.

Surface Treatment Process of the Plates before the Final Painting



Safety

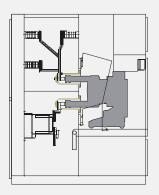
The MTW switchgear are internal-arc resistant and manufactured according to the requirements of IEC 62271-200 standard, ensuring total safety in the operation for both operators and installations.

- Switchgear developed and manufactured with type tests according to IEC 62271-200
- Various options of device combination to meet the customer's needs and demands
- Fast withdrawable circuit breaker/contactor replacement using the cart for handling and installation
- Fast and easy expansion due to its modular design
- Minimum maintenance
- Easy access to the compartments for maintenance by means of removable covers and doors
- Interlock system against incorrect operations
- High safety level for the operators, with all the main circuit breaker operations executed with the medium voltage door closed
- Air-insulated switchgear, with reduced dimensions, allowing smaller sizes of electric rooms
- No need for insulating gas handling or pressure supervision
- Quality assurance according to ISO 9001
- Metal enclosure, shutters and separators grounded
- Switchgear with internal arc rating according to IEC, with front, side and rear access, for all the short-circuit currents

Interlocks

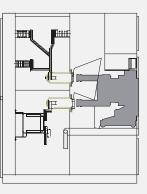
- Interconnections between the circuit breaker/contactor compartment door and its compartment do not allow access to them in the "ON" position.
- Interconnections between circuit breaker/contactor and earthing switch do not allow switching them on simultaneously
- The circuit breaker/contactor can only be moved to the "TEST/EXTRACTED" position in the "OFF" condition without having to open the switchgear door
- The circuit breaker/contactor cannot be operated between the "INSERTED" and "TEST/EXTRACTED" positions
- For the units equipped with contactors, in case one of the fuses actuates, the contactor will automatically switch off

Position of the circuit breaker/contactor	Interlock
Inserted/Service	It is impossible to move the circuit breaker/contactor switched on It is impossible to close the earthing switch It is impossible to open the door of the circuit breaker/contactor compartment
Between the Inserted and Test/Extracted position	It is impossible to open the door of the circuit breaker/contactor compartment It is impossible to switch on the circuit breaker/contactor It is impossible to close the earthing switch It is impossible to disconnect the plug from the circuit breaker/contactor control
Test/Extracted	It is impossible to switch on the circuit breaker/contactor It is impossible to connect the circuit breaker/contactor if the earthing switch is closed It is impossible to close the contactor/circuit breaker compartment door without connecting the circuit breaker control plug



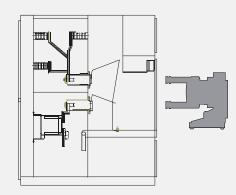
"INSERTED" Position

It is impossible to move the circuit breaker/contactor switched on.



"TEST/EXTRACTED" Position

The circuit breaker/contactor is extracted or inserted with the compartment door closed.



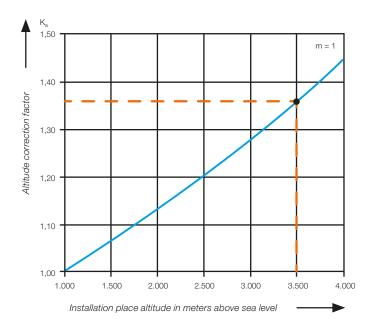
"REMOVED" Position

Automatic flaps protect against touch while the circuit breaker/ contactor is extracted.



Altitude Ratio-Corrector Factor K_a

For installation at altitudes above 1,000 m of sea level, the altitude correction factor K_a is applied to the rated lightning impulse withstand voltage (BIL), depending on the installation altitude above sea level, as shown in the chart below:



E.g.:

For an installation at 3,500 meters above sea level, 7.2 kV of rated voltage, 60 kV of rated lightning-impulse withstand voltage (BIL):

Rated lightning-impulse withstand voltage (BIL) to choose = $60 \text{ kV} \cdot 1.36 = 81.6 \text{ kV}$

Result:

We need to choose a switchgear with a rated lightning-impulse withstand voltage (BIL) equal to or above the result (81.6 kV). According to the dielectric strength table below, you should choose a switchgear for a rated voltage of 17.5 kV with a rated lightning-impulse withstand voltage (BIL) of 95 kV.

Dielectric strength table						
Rated voltage kV 3.6 7.2 12 17.5 24 36						36
Rated lightning-impulse withstand voltage (BIL)						
Between phases and earth kV 40 60 75 95 125 170						

Information according to IEC 60694, item 2.2.1.



Main Standards

Device	Description	IEC Standard
Switchesor	MTW	IEC 62271-200
Switchgear	Degree of protection	IEC 60694
	Power circuit breakers	IEC 62271-100
	Power contactors	IEC 62271-106
Devices	Switch disconnectors and earthing switches	IEC 62271-102
	Switch disconnector/fuses	IEC 62271-105
	Fuses	IEC 60282-1
	Current transformers	IEC 61869-2
Measurement transformers	Voltage transformers	IEC 61869-3

Concepts

Internal arc classification			
General designation	IAC (Internal Arc Classified)		
	A	Restricted to the authorized personnel	
Accessibility types	В	Unrestricted, including public in general	
	C	Restricted by installation	
	F	Front	
Sides of the enclosure	L	Side	
	R	Rear	
Testing values	Icc (kA) - t (s)		

E.g.:

IAC AFLR 40kA 1s: internal arc-resistant equipment, access restricted to authorized personnel by all the sides (front, side and rear), with value of 40 kA in one second.

IAC BF ALR 25kA 1s: internal arc-resistant equipment, unrestricted access, including general public, to the front of the switchgear; however, the access to the other sides (side and rear) is restricted to authorized personnel, with value of 25 kA in one second.

Loss of service continuity class				
It defines the possibility to keep the other c	ompartments and/or functional units energized when opening one compartment of the main circuit			
LSC 1	Switchgear without compartmentalization between the medium voltage equipment			
LSC 2A	Safe access to the compartment of the functional unit With busbar energized, as well as with adjacent units energized MV cables must be connected to the ground			
LSC 2B	Safe access to the functional unit compartment With busbar energized, as well as with adjacent units energized The MV cables must be in a separate compartment Functional unit cable in maintenance may remain energized			

Partition classes				
PM All divisions between compartments must be metallic and will be properly grounded, ensuring safe access				
PI Divisions between compartments may be partial or totally made of insulating material				

MTW03 Switchgear

Rated Voltage up to 17.5 kV

Rated Current up to 3,150 A Three-Phase Symmetrical Short-Circuit Current (Icc) up to 31.5 kA

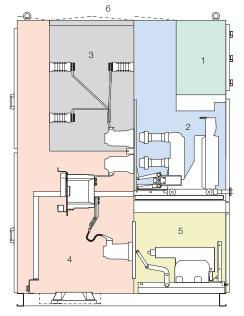


Technical data					
Electrical					
Rated voltage		kV	7,2 17,5		
Rated current		А	630 - 1,250 - 1,600 -	2,000 - 2,500 - 3,150	
Rated lightning-impul	se withstand voltage (BIL)	kV	60	95	
Rated withstand volta	ge at industrial frequency	kV	20	38	
Three-phase symmet	rical short-circuit current (lcc) (1s)	kA	25 -	31.5	
Internal arc testing cl	assification		IAC BF ALR 31.5 kA 1s		
		Mechanica	al		
Degree of protection ¹)		IP-4X		
Height		mm	2,300 (pressure relief on top)		
neight		11111	2,650 (with top duct for the exit of gases)		
Width ²⁾			650 (≤1,250 A)		
with '		mm	1,000 (≥1,600 A)		
Depth		mm	1,680 (lower cable inlet/outlet)		
Берш			1,980 (upper cable inlet/outlet)		
Approximate weight		kg	1,200 (≤1,250 A)		
Approximate weight		Ny	1,400 (≥1,600 A)		
	Structure		3.04	(11)	
Plate thickness	Walls	mm (MSG)	2.66 (12)		
	Shield		2.66 (12)		
Loss of service contin	uity class	ass LSC 2B			
Partition class		PM			
Seismic zone ³⁾		UBC-4 - Horizontal acceleration of 0.6 g and vertical acceleration of 0.36 g			
Ambient temperature		-5 °C+40 °C			
Installation altitude		Up to 1,000 masl (for higher levels, see page 8)			

Notes: 1) Other degrees of protection under request.

2) For switchgear with switch disconnector (630 or 1,250 A), width of 1,000 mm.

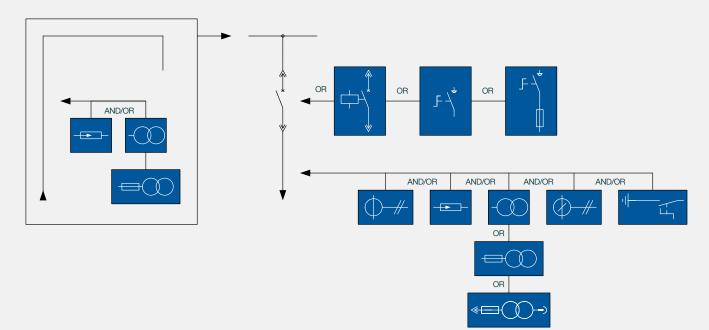
3) By means of computer simulation (Modal Analyses).



- 1) Low voltage compartment
- 2) Circuit breaker compartment
- 3) General bar compartment
- 4) Output cable and CT compartment
- 5) PT compartment
- 6) Flaps for evacuation of the gases



Dimensions (mm)					
Cables entry	Current (A)	Height (X)	Width (Y)	Depth (Z)	
Detterre entre	≤1,250 A		650	1 690	
Bottom entry	≥1,600 A	2 200	1,000	1,680	
Ten entre	≤1,250 A	2,300	650	1 0 9 0	
Top entry	≥1,600 A		1,000	1,980	



MTW04 Switchgear

Rated Voltage up to 17.5 kV

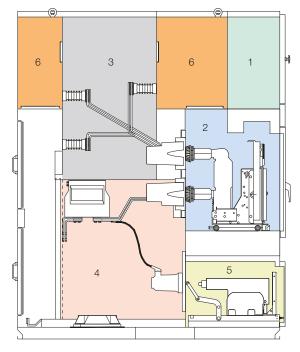
Rated Current up to 4,000 A

Three-Phase Symmetrical Short-Circuit Current (Icc) up to 50 kA

Technical data					
Electrical					
Rated voltage		kV	7.2	17.5	
Rated current		А	630 - 1,250 - 1,600 - 2,00	00 - 2,500 - 3,150 - 4,000	
Rated lightning-impul	se withstand voltage (BIL)	kV	60	95	
Rated withstand volta	ge at industrial frequency	kV	20	38	
Three-phase symmetre	rical short-circuit current (lcc) (1s)	kA	40 -	- 50	
Internal arc testing cla	assification		IAC AFLR 50 kA 1s		
		Mechanica	al		
Degree of protection ¹⁾			IP-4X		
Height		mm	2,500 (duct for the e	xit of gases included)	
Width		mm	750 (≤2,000 A)		
width			1,000 (2,500 A)		
Depth		mm	2,000 (lower cable inlet/outlet)		
Берш		11111	2,500 (upper cable inlet/outlet)		
Approximate weight		l.e.	1,400 (≤2,000 A)		
Approximate weight		kg	1,900 (≥	2,500 A)	
	Structure		3.04	(11)	
Plate thickness	Walls	mm (MSG)	3.04	(11)	
	Shield		3.04	(11)	
Loss of service contin	uity class	LSC 2B			
Partition class		PM			
Seismic zone ²⁾		UBC-4 - Horizontal acceleration of 0.6 g and vertical acceleration of 0.36 g			
Ambient temperature		-5 °C+40 °C			
Installation altitude		Up to 1,000 masl (for higher levels, see page 8)			

Notas: 1) Other degrees of protection under request.

2) By means of computer simulation (Modal Analyses).

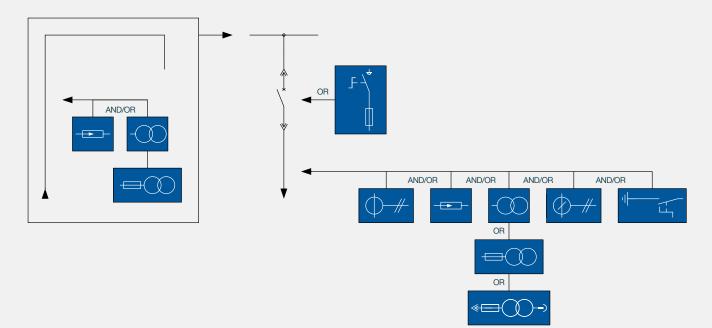


- 1) Low voltage compartment
- 2) Circuit breaker compartment
- 3) General bus compartment
- 4) Output cable and CT compartment
- 5) PT compartment
- 6) Duct for evacuation of the gases





Dimensions (mm)				
Cables entry	Current (A)	Height (X)	Width (Y)	Depth (Z)
Dettem entry	≤2,000 A	2.500	750	2 000
Bottom entry	≥2,500 A		1,000	2,000
Top optru	≤2,000 A	2,500	750	2,500
Top entry	≥2,500 A		1,000	2,500



MTW05 Switchgear

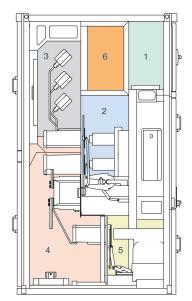
Rated Voltage up to 17.5 kV

Rated Current up to 2,500 A Three-Phase Symmetrical Short-Circuit Current (Icc) up to 31.5 kA



Technical data					
Electrical					
Rated voltage		kV	7.2 17.5		
Rated current		А	630 - 1,250 - 1,60	0 - 2,000 - 2,500	
Rated lightning-impul	se withstand voltage (BIL)	kV	60	95	
Rated withstand volta	ge at industrial frequency	kV	20	38	
Three-phase symmetri	rical short-circuit current (lcc) (1s)	kA	25 -	31.5	
Internal arc testing cla	assification		IAC BF ALR 31.5 kA 1s		
		Mechanic	al		
Degree of protection ²⁾			IP-41		
Height		mm	2,300 (duct for the ex	kit of gases included)	
			600 (≤1,250 A)		
Width		mm	750 (≤2,000 A)		
			950 (2,500 A)		
Depth		mm	1,300 (lower cable inlet/outlet)		
Берш		11111	1,600 (upper cable inlet/outlet)		
			1,000 (≤1,250 A)		
Approximate weight		kg	1,150 (≤2,000 A)		
			1,300 (2,500 A)		
	Structure and walls		1.90	(14)	
Plate thickness	Struts	mm (MSG)	3.04 (11)		
	Front part		2.66 (12)		
Loss of service continuity class LSC 2B					
Partition class	ss Pl				
Seismic zone ³⁾		UBC-4 - Horizontal acceleration of 0.6 g and vertical acceleration of 0.36 g			
Ambient temperature		-5 °C+40 °C			
Installation altitude	de Up to 1,000 masl (for higher levels, see page 8)			ee page 8)	

Notes: 1) Other degrees of protection under request. 2) By means of computer simulation (Modal Analyses).

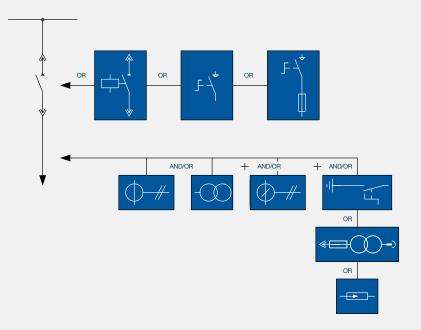


- 1) Low voltage compartment
- 2) Circuit breaker compartment
- 3) General bar compartment
- 4) Output cable and CT compartment
- 5) PT compartment
- 6) Duct for evacuation of the gases





Dimensions (mm)							
Cables entry	Current (A)	Height (X)	Width (Y)	Depth (Z)			
Bottom entry	<1.250 A	2 200	600	1,300			
Top entry	≤1,250 A	2,300	000	1,600			
Bottom entry	≤2,000 A	2,300	750	1,300			
Top entry	≤2,000 A	2,300	750	1,600			
Bottom entry	2,500 A	2,300	950	1,300			
Top entry	2,300 A	2,300	900	1,600			



MTW04 Switchgear - 24 kV

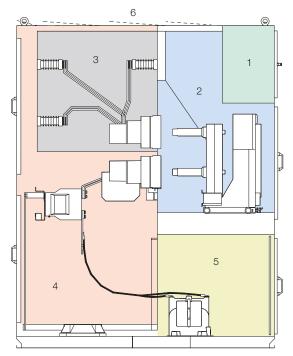
Rated Voltage up to 24 kV

Rated Current up to 1,250 A Three-Phase Symmetrical Short-Circuit Current (Icc) up to 25 kA



Technical data						
Electrical						
Rated voltage		kV	24			
Rated current		А	630 - 1,250			
Rated lightning-impu	lse withstand voltage (BIL)	kV	125			
Rated withstand volta	ge at industrial frequency	kV	50			
Three-phase symmet	rical short-circuit current (lcc) (1s)	kA	25			
Internal arc testing classification			IAC BF ALR 25 kA 1s			
		Mechanica	al			
Degree of protection ¹⁾		IP-4X				
Height		mm	2,500 (pressure relief on top)			
noight		11111	2,850 (with top duct for the exit of gases)			
Width		mm	800			
Depth		mm	2,000			
Approximate weight		kg	2,000			
	Structure		1.90 (14)			
Plate thickness	Walls	mm (MSG)	3.04 (11)			
	Base		2.66 (12)			
Loss of service continuity class		LSC 2B				
Partition class		РМ				
Seismic zone ²⁾		UBC-4 - Horizontal acceleration of 0.6 g and vertical acceleration of 0.36 g				
Ambient temperature		-5 °C+40 °C				
Installation altitude		Up to 1,000 masl (for higher levels, see page 8)				

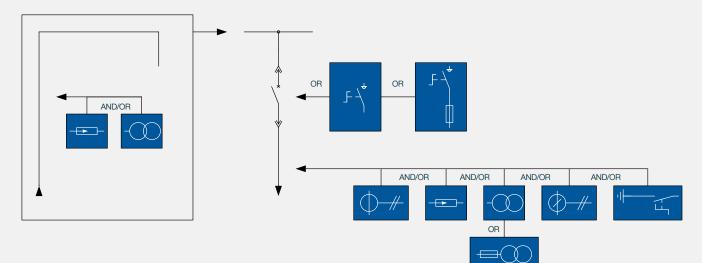
Notas: 1) Other degrees of protection under request. 2) By means of computer simulation (Modal Analyses).



- 1) Low voltage compartment
- 2) Circuit breaker compartment
- 3) General bar compartment
- 4) Output cable and CT compartment
- 5) PT compartment
- 6) Flaps for evacuation of the gases



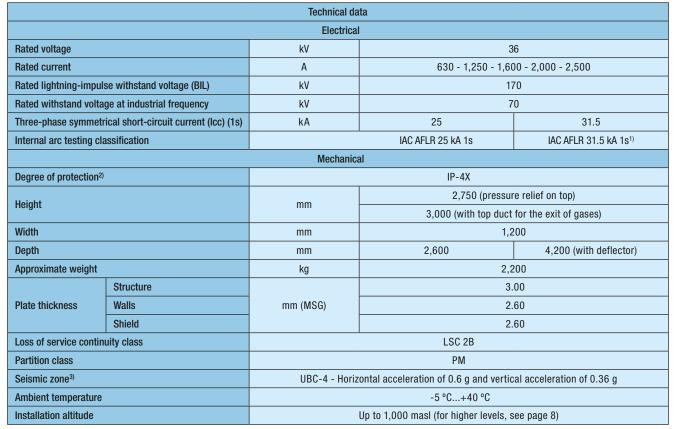
Dimensions (mm)						
Cables entry	Current (A)	Height (X)	Width (Y)	Depth (Z)		
Bottom entry	1,250 A	2 500	1,200	2,000		
Top entry	≤1,250 A	2,500	1,200	2,500		



MTW04 Switchgear - 36 kV

Rated Voltage up to 36 kV

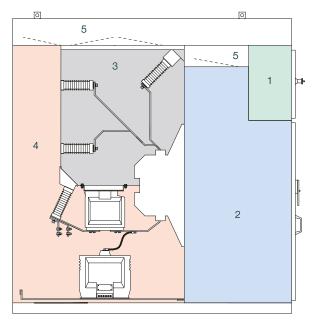
Rated Current up to 2,500 A Three-Phase Symmetrical Short-Circuit Current (Icc) up to 31.5 kA



Notes: 1) Deflector and covers for pressure relief.

2) Other degrees of protection under request.

3) By means of computer simulation (Modal Analyses).



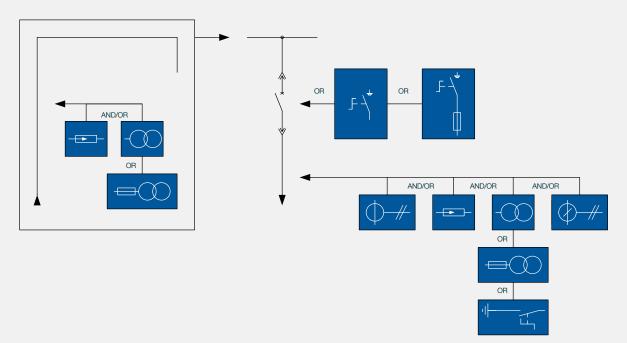
- 1) Low voltage compartment
- 2) Circuit breaker compartment
- 3) General bar compartment
- 4) Output cable, CT and PT compartment
- 5) Flaps for evacuation of the gases







Dimensions (mm)							
Cables entry	lcc (kA)	Current (A)	Height (X)	Width (Y)	Depth (Z)		
Bottom entry	25	≤2,500 A	0.750	1,200	2,600		
Top entry		≤2,500 A			2,850		
Bottom entry	31.5	≤2,500 A	2,750		4.000		
Top entry		≤2,500 A			4,200		

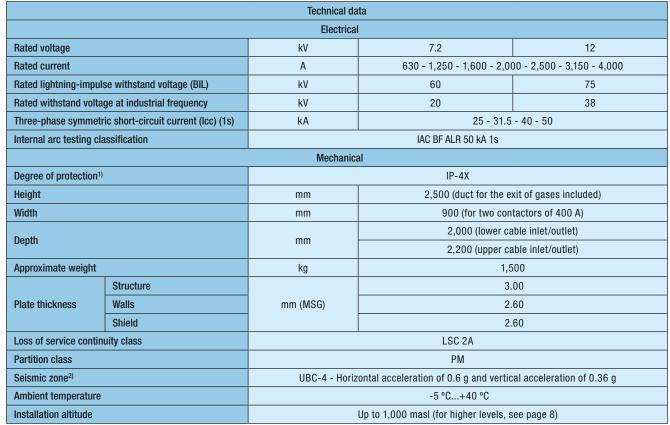


MTW04 Switchgear - MV MCC Version

Rated Voltage up to 12 kV

Rated Current up to 4,000 A

Three-Phase Symmetrical Short-Circuit Current (Icc) 50 kA



Notes: 1) Other degrees of protection under request.

2) By means of computer simulation (Modal Analyses).

Compartmentalizations

20



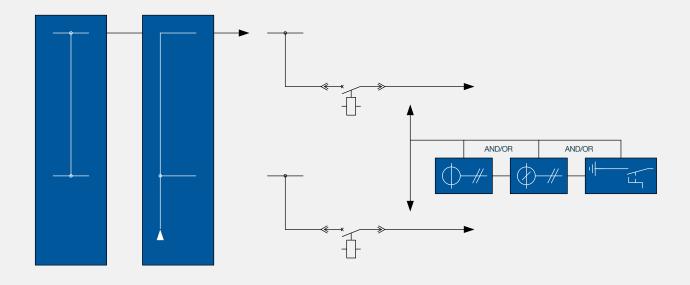
- 1) Low voltage compartment
- 2) Contactor compartment 1
- 3) Contactor compartment 2
- 4) General bar compartment 1
- 5) Output cable and CT compartment 1
- 6) General bar compartment 2
- 7) Output cable and CT compartment 2
- 8) Ducts for evacuation of the gases







Dimensions (mm)							
Cables entry Current (A) Height (X) Width (Y) Depth							
Bottom entry	≤400 A	2,500	900	2,000			
Top entry	≤400 A	2,500	900	2,200			





General Comparison of WEG Switchgear

Designation	MT	МТW03 МТW			N04		MTW05	
Rated voltage (Vr)						36		
	7.2	17.5	7.2	17.5	24		7.2	17.5
Rated current (A)	3,150	3,150	4,000	4,000	1,250	2,500	2,500	2,500
Three-phase symmetrical short circuit current		<u> </u>						
(Icc) 1s (kA)	31.5	31.5	50	50	25	31.5	31.5	31.5
System for evacuation of the gases due to internal arc	Pressure relief covers "Flaps" (top)		Side duct		Pressure relief covers "Flaps" (top)		Side duct	
Internal arc classification	IAC BF ALR		IAC AFLR		IAC BF ALR	IAC AFLR	IAC BI	ALR

Global presence is essential, as much as understanding your needs.

Global Presence

With more than 30.000 employees worldwide, WEG is one of the largest electric motors, electronic equipments and systems manufacturers. We are constantly expanding our portfolio of products and services with expertise and market knowledge. We create integrated and customized solutions ranging from innovative products to complete after-sales service.

WEG's know-how guarantees our *Medium Voltage Switchgear and Motor Control Center* is the right choice for your application and business, assuring safety, efficiency and reliability.



Availability is to have a global support network



Partnership is to create solutions that suit your needs

Competitive edge is to unite technology and innovation

Know More

High performance and reliable products to improve your production process.

Excelence is to provide a whole solution in industrial automation that improves our customers productivity.





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