Technical specifications

Standards and specifications	**Type-tested low-voltage switchgear and control gear assembly (TTA) Testing of response to internal faults (arcing faults)**	**IEC 61439-1, DIN EN 61439-1 (VDE 0660 Part 500) IEC 61641, VDE 0660 Part 500, Supplement 2**	
Creepage distances and clearances	Rated impulse withstand voltage (U_{imp})	8 kV	
	Overvoltage category	III	
	Pollution degree	3	
Rated insulation voltage (Ui)		1000 V	
Rated operational voltage (Ue)		690 V	
Rated currents (In)	Main horizontal busbars	Rated current	≤ 7400 A
Busbars (3-pole and 4-pole)		Rated peak withstand current (Ipk)	≤ 375 kA
		Rated short-time withstand current (Icw)	≤ 150 kA, 1 s ≤ 120 kA, 3 s
	Vertical busbars for circuit breakers	Rated current	≤ 6300 A
		Rated peak withstand current (Ipk)	≤ 250 kA
		Rated short-time withstand current (Icw)	≤ 100 kA, 1 s ≤ 80 kA, 3 s
	Vertical busbars for fixed-mounted design	Rated current	≤ 1400 A
		Rated peak withstand current (Ipk)	≤ 163 kA
		Rated short-time withstand current (Icw)	≤ 65 kA*, 1 s ≤ 50 kA, 3 s
	Vertical busbars for withdrawable-unit design	Rated current	≤ 1200 A
		Rated peak withstand current (Ipk)	≤ 163 kA
		Rated short-time withstand current (Icw)	≤ 65 kA*, 1 s ≤ 50 kA, 3 s
Switchgear rated currents		Circuit breakers	≤ 6300 A
		Outgoing feeders	≤ 630 A
Internal separation	Form 1 to Form 4	IEC 61439-1, Section 7.7, DIN EN 61439-1	
Surface treatment	Frame parts	Galvanized/powder-coated/wet-painted	
	Enclosure	Galvanized/powder-coated/wet-painted	
	Doors	Powder-coated/wet-painted	
Degree of protection	To IEC 60529, EN 60529	IP 30 to IP 54	
Dimensions		Height: 2200, 2600 mm (with busbar top unit) Width: 400, 600, 800, 1000, 1200 mm Depth: 600, 800, 1000, 1200 mm	

* Rated conditional short-circuit current I_{cc} ≤ 100 kA

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MNS Switchgear Overview

Technical Data

Standards		Low Voltage Switchgear and Controlgear Assemblies – Verification by testing*	IEC 61439-1/-2
Test certificates		ASTA, Great-Britain (resist. to accidental arcs acc. to IEC 61641 and IEC 60298, Appendix AA) DLR German Research Institute for Aerospace e. V. Jülich, Earthquake Test for Security Areas in Nuclear Power Stations IABG Industrieanlagen Betriebsgesellschaft, Vibration and shock tests Complying with Germanischer Lloyd, Hamburg	
Electrical data	Rated voltages	Rated insulation voltage U_i	1000 V 3~, 1500 V- **
		Rated operating voltage U_e	690 V 3~, 750 V-**
		Rated impulse withstand voltage Uimp	6 / 8 / 12 kV **
		Overvoltage category	II / III / IV **
		Degree of pollution	3
		Rated frequency	up to 60 Hz
	Rated current	Copper Busbars:	
		Rated current Ie	up to 6300 A
		Rated peak withstand current Ipk	up to 250 kA
		Rated short-time withstand current Icw	up to 100 kA
		Copper Distribution bars:	
		Rated current Ie	up to 2000 A
		Rated peak withstand current Ipk	up to 176 kA
		Rated short-time withstand current Icw	up to 100 kA
	Arc Fault Containment	Rated operational voltage	up to 690 V
		Prospective short-circuit current	up to 100 kA
		Duration	300 ms
		Criteria (IEC 61641)	1 to 7
	Forms of separation		up to Form 4
Mechanical characteristics	Dimensions	Cubicles and frame	DIN 41488
		Recommended height	2200 mm
		Recommended width	400, 600, 800, 1000, 1200 mm
		Recommended depth	400, 600, 800, 1000, 1200 mm
		Basic grid size	E = 25 mm acc. to DIN 43660
	Degrees of Protection	According to IEC 60529	External from IP 30 to IP 54 Internal from IP 2X
	Steel components	Frame, incl. internal subdivisions	2.0 / 2.5 mm
		Cladding, internal	1.5 / 2.0 mm
		Cladding, external	1.5 mm
	Surface protection/Paint	Frame, incl. internal subdivisions	Zinc or Alu-zinc coated
		Cladding, internal	Zinc or Alu-zinc coated
		Cladding, external	Zinc or Alu-zinc coated and Powder coated RAL 7035 (light grey)
	Plastic components	Halogen-free, self-extinguishing, flame retardant, CFC-free	IEC 60707, DIN VDE 0304 part 3
Optional Extras, available on request	Busbar system	Busbars	Fully insulated with heat shrinkable sleeving Silver plating Tin plating
	Special qualification	Test certificates	See test certificates listed above
	Paint	Enclosure	Special colours on request

* Design verification by testing: Where an Assembly has previously been tested in accordance with IEC 60439-1, and the results fulfil the requirements of IEC 61439-1/-2, the verification of these tests need not be repeated.

** Depending on the electrical equipment

1 Technical data

1.1 Electrical data

Rated voltage	kV	36	40.5
Rated power frequency withstand voltage	kV	80	95
Rated lightning impulse withstand voltage	kV	170	185
Insulation to:		DIN VDE/IEC	Chinese GB
Rated frequency	Hz	50/60	50
Rated current of busbars	A	...3150	…3150
Rated current of tee-offs, circuit-breaker	A	...3150 [3)]	…3150 [3)]
Rated peak withstand current [1)]	kA	...80 [5)]	...80
Rated short-circuit breaking	kA	...31.5 [4)]	...31.5
current of circuit-breaker			
Rated short-time current 3 s [1)]	kA	...31.5 [4)]	...31.5
Auxiliary voltage	V	DC [2)] 60, 110, 125; AC 110, 220	DC 110, 220

1) Take the short-circuit withstand capability of the instrument transformers into account separately.

2) Special DC voltages on request.

3) Up to 3150 A at 40°C and 2500 A at 55°C with forced ventilation.

4) 40 kA on request.

5) 100 kA on request.

1.2 Resistance to internal arc faults

The fault withstand capability is 31.5 kA, 1 s. Criteria

1 to 6 of PEHLA guideline no. 4 (in conjunction with VDE 0670 part 6 and IEC 62271-200) are fulfilled. In individual cases, depending on the configuration of the switchgear panels and/or the switchroom conditions (e.g. low ceiling height), additional measures may be necessary to ensure compliance with criterion 5.

1.3 Dimensions and weights

(Figure 2/1 and 2/2)

Dimension according to Figures 2/1 and 2/2

Weight: 1300 kg to 1850 kg, according to the equipment installed.

1.3 General electrical characteristics

Switchboard		12 kV	17.5 kV	24 kV
Rated voltage	kV	12	17.5	24
Rated insulation voltage	kV	12	17.5	24
Rated power frequency withstand voltage	kV (1 min)	28[1]	38	50
Rated lightning impulse withstand voltage	kV	75	95	125
Rated short-time withstand current Peak current	kA (3s) kA	31.5 80	31.5 80	31.5 80
Rated short-time withstand current Peak current	kA (1s) kA	50 125	50 125	– –
Internal arc withstand current	kA (1s) kA (0.5s)	31.5-40 50	31.5-40 50	31.5 –
Branch connectors rated currents	A	630 1250 1600 2000 2500 3150 3600[2] 4000[2]	630 1250 1600 2000 2500 3150 3600[2] 4000[2]	630 1250 1600 2000 2500[2]
Main busbars rated currents	A	1250 1600 2000 2500 3150 3600[2] 4000[2]	1250 1600 2000 2500 3150 3600[2] 4000[2]	1250 1600 2000 2500[2]

[1] Also available at 42 kV (1 min).
[2] With forced ventilation in the circuit-breaker compartment: a further fan is required at the rear of the switchboard for 4000 A versions.

1.3.1 Earthing switch electrical characteristics

Earthing switch with making capacity		12 kV	17.5 kV	24 kV
Rated short-time withstand current	kA (3s) kA (1s)	31.5 40-50	31.5 40-50	31.5 –
Making capacity	kAp	80 125	80 125	80 –

Technical data / Dimensions

Technical data

Rated voltage Ur	**[kV]**	**12**	**17.5**	**24**
Rated lightning impulse withstand voltage U_p				
Common value	[kV]	75	95	125
Across the isolating distance		85	110	145
Rated short-duration power-frequency withstand voltage U_d				
Common value	[kV]	28 (1)	38 (1)	50
Across the isolating distance		32 (1)	45 (1)	60
Rated frequency	[Hz]	50/60	50/60	50/60
Rated current Ir				
Busbar	[A]	630/1250	630/1250	630
Feeder		630	630	630
Rated short-time withstand current				
Main circuit	[kA]	25	20	20
Earthing circuit	[kA]	25	20	20
Rated duration of short circuit	[s]	1/2	1/3	1/3
Rated peak withstand current	[kA]	62,5	50	50
Arc-fault current, 1s	[kA]	20	20	20
Degree of protection (IP-code)				
For the enclosure		IP 3X	IP 3X	IP 3X
For the partitions		IP 2X	IP 2X	IP 2X
Mechanical endurance of switch c/o		5000	5000	5000
Mechanical endurance of earthing switch c/o		1000	1000	1000
Ambient temperature				
Maximum value	[°C]	+40	+40	+40
Maximum value of 24 h-mean		+35	+35	+35
Minimum value		-5	-5	-5 (3)
Altitude above sea level	[m]	≤1000 (2)	≤1000 (2)	≤1000 (2)

(1) Higher values in accordance with national standards on request

(2) Adjustment is necessary for greater altitudes

(3) Lower ambient temperature on request.

Dimensions

Rated voltage Ur	**[kV]**	**12**	**17.5**	**24**
Width / circuit breaker cubicle	[mm]	750	750	750
Width / other cubicles	[mm]	375/500	375/500	375/500
Height	[mm]	1635/1885	1635/1885	1635/1885
Depth	[mm]	940+60	940+60	940+60
Height / LV-compartment	[mm]	450	450	450

Electrical characteristics

Rated voltage kV	[kV]	36
Rated insulation voltage	[kV]	36
Rated power frequency withstand voltage	kV 1min	70
Rated lightning impulse withstand voltage	kV	170
Rated frequency	Hz	50-60
Rated short time withstand current	kA 3	...31.5
Peak current	kA	...80
Internal arc withstand current	kA 1 s	...31.5
Main busbars rated current	A	1250
		1600
		2000
		2500
		3150
Branch connections rated current	A	1250
		1600
		2000
Branch connection rated current with forced ventilation with fan	A	2500
Branch connection rated current with forced ventilation with fans (available only with VD4 vacuum Circuit Breaker)	A	3150

The electrical characteristics of the switchboard can vary for ambient conditions other than those described in the previous section and also if a higher degree of protection is used.

Degrees of protection

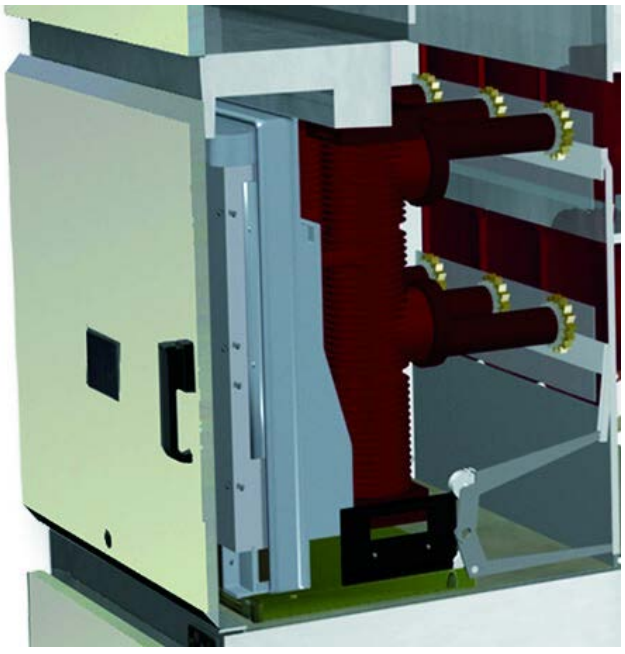
The degrees of protection of the switchgear conform with IEC 60529 Standards.
UniGear ZS2 switchgear is normally supplied with the following standard degrees of protection:

- IP4X for the enclosure.
- IP2X for the partition between compartments.

On request, the external housing can be supplied with a higher degree of protection; in this case please contact your ABB sales representative.

Colour of the external surfaces

RAL7035 - ligh grey (front doors).
Other colours available on request.



Circuit-breaker compartment