Prefabricated Substation

TDK

Technical Data

TGOOD
2018-12-9

1. TDK prefabricated substation technical data

General technical data	
Standard compliance	IEC 62271-202
Frequency (Hz)	50
Transformer power (kVA)	315/750/1000/1600
Transformer primary voltage (kV)	11
Transformer secondary voltage (V)	415
MV switchgear rated voltage (kV)	12
MV switchgear configurations	CF/CCF/CCCF/CV/CCV/CCCV
TDK general arrangement	The individual compartments (Transformer, MV, LV)

General technical data		
Enclosure material	mm	2
Base frame material		Hot dip galvanized steel, or painting
Service life	year	30
Paint system		Paint system shall be suitable for outdoor operational life of >30 years.
Color range		TGOOD standard or on customer request
Dimensions L x W x H	mm	3150x2000x1600 for 750kVA 3900x2000x2000 for 1600kVA
Width	mm	W=2100
IP ratings		
Transformer compartment		IP23D
HV compartment		IP54
LV compartment		IP54
Environment conditions		
Altitude	m	⩽1000 (>1000 optional)
Humidity	%	98
Ambient temperature	℃	-5 - +40 (lower or higher temperature optional)

Max sunlight	LX	Up to 100
Cyclone rating / wind		Region D / Terrain category 2
Salt spray	Hours	1000
Pollution		In accordance with IEC 60815
Sound level		In accordance with IEC 60076
Cooling mechanisms		Natural
Earthing		In accordance with IEC62271.202.
Oil containment		110% oil volume
Mechanical deformation		Withstand at least 2500N/m^2
Mechanical impact		20 Joules, IK10
Assembly method		
Enclosure		Riveted and bolted
Base frame		Welding
Hinges		
Material/design		Stainless steel, diameter 10mm
Mounting		External
Opening angle	Degree	170
Door stays		Lockable under wind up to 25 m/s.
Door locks		Three-point locking - padlock or key.
Internal arc classification		IAC – A/B-20kA-1s

2. TDT-I transformer technical data

Environmental conditions		
Altitude	m	<1000
Maximum ambient temperature	°C	40 (higher temperature optional)
Minimum ambient temperature	°C	-5 (lower temperature optional)
Annual rainfall	mm	Max: 1800-2400; Min: 0-100
Average annual lighting ground flash density	Strikes/km²	3
Solar radiation- maximum	kW/m²	1.1, high ultra violet content
Humidity	%	95
Pollution level	mg/cm²	ESDD 0.2 to 0.5
Power system conditions		
Frequency	Hz	50
Highest system voltage	kV	12
No. of phases		3
Impulse withstand voltage (peak)	kV	95
Power frequency withstand voltage (rms)	kV	28
Nominal system voltage	kV	12
System earthing		Solidly earthed
System fault level	kA/s	25/1
Auxiliary power supplies	V	220, AC
General technical parameters		
Applicable standards		IEC 60076
Installation location		Outdoor in enclosure
No. of windings		2
Rated voltage ratio		11000/415
Rated power	kVA	315/500/750/1000/1600
Vector group		Dyn11
Type of cooling		ONAN
Winding material		Cu
Short-circuit impedance	%	4, 5, 5, 6
Oil conservation system (NA for dry type)		Sealed
Sound pressure level at 0.3m	dB	⩽45

Operation flux density		<1.6
No-load loss		315: 0.48kW 500: 0.68kW 750: 0.93kW 1000: 1.15kW 1600: 1.64kW
Load loss		315: 3.83kW 500: 5.41kW 750: 7.1kW 1000: 10.3kW 1600: 14.8kW
Insulation and cooling medium		
Mineral insulating oil (where used)		Yes
Standard		IEC 60296
Tap changer requirement		
Tap changer location		HV side
Tapping range		+4/-2 x 2.5%
Tapping positions		7
Tapping method		Off load (locked in each position)
External connections		
HV		In accordance with IEC 60137
Terminal type		Cast resin, bolted/ plug in type
Paint system		TGOOD process
Paint thickness	um	>110
Paint color		As per customer requirement
Magnetic core material		Grain-oriented, silicon steel
LV winding material		Cu
HV winding material		Cu
Fittings		
Rating plate		Yes
Lifting lug		Yes
Oil level indicator		Yes
Oil thermometer		Yes
Winding thermometer		Optional
Temperature gauge		One for top oil
Thermometer pocket		Yes

Drain valve	Yes
Pressure relief valve	Yes
Filler cap	Yes
Transformer earthing connection/ terminal	Stainless steel earth bar
Filter valve	Yes
Transformer markings	Yes
Terminal markings/ marking plate	As per IEC 60076

3. TGS RMU technical data

Standard compliance		
Switchboard		IEC 62271-200, IEC 62271-1
Behavior in the event of internal faults		IEC 62271-200
Earthing switch (in C, F, V, De, I)		IEC 62271-102
Disconnector (in V, I)		IEC 62271-102
General use switch (in C)		IEC 62271-103
Switch-disconnector fuse combination (in F)		IEC 62271-105
Circuit-breaker (in V, I)		IEC 62271-100
Current transformer		IEC 61869-2
Voltage transformer		IEC 61869-3
Voltage presence indicators		IEC 62271-206
Voltage detection systems		IEC 61243-5
IP class		IEC 60529
Service condition		
Indoor/ outdoor		Indoor/ Outdoor
Minimum ambient temperature	^{0}C	*-5 (lower value optional)
Maximum ambient temperature	^{0}C	*+40 (higher value optional)
Maximum altitude	M	1000 (higher value optional)
Relative humidity range	%	95
Pollution level		I, II
Design and construction		

Loss of service continuity category		LSC2B
Partition class		PM
Thickness of gas tank	mm	3
Width of functions C/F/V	mm	368/368/368
Type of accessibility - busbar		Tools
Type of accessibility - main device		Interlock
Type of accessibility - cable		Interlock
Type of accessibility - CT		Interlock
Type of accessibility - VT		Tools & interlock
Internal arc classification		A FLR-20kA-1s
Insulation medium		SF6 Gas
Rated filling level for insulation	Pa	40,000
Alarm level for insulation	Pa	30,000
Minimum functional level for insulation	Pa	30,000
Insulating fluid and mass	kg	5 (CCF)
Degree of protection – compartment	IP	3X
Degree of Protection - enclosure outdoor	IP	33
Busbar material		Red copper / T2Y
Busbar cross section	mm	40 × 8
Support insulator material		Epoxy resin
Support insulator creepage distance	mm	135
Earth bar material		Red copper / T2Y
Earth bar cross section	mm	25 x 8
Limit of temperature rise - main circuits	K	75
Limit of temperature rise - contacts	K	65
Limit of temperature rise – connections	K	75
Limit of temperature rise – terminals	K	75
Limit of temperature rise - insulating material	K	120
Limit of temperature rise - accessible parts	K	30
Switchgear overall surface finish and color		RAL7035
Typical panel dimensions (L x D x H)	mm	1050*800*1500/1230

Typical panel weight	kg	650
General electrical characteristics		
No. of phases		3
Rated voltage	kV	12/24
Rated frequency	Hz	50/60
Type of neutral earthing		Effectively earthed
Rated lightning impulse withstand voltage to earth	kV	95/125
Rated lightning impulse withstand voltage across isolation	kV	110/145
Rated power frequency withstand voltage to earth	kV	28/50
Rated power frequency withstand voltage across isolation	kV	32/60
Rated busbar normal current	A	630
Rated short-time withstand current	kA/s	25/1, 20/3
Rated peak withstand current	kA	52/65
Rated auxiliary voltage for operation	V	220-30
Rated auxiliary voltage frequency for operation		AC / DC
Rated auxiliary voltage frequency for heating		AC / DC
Partial discharge guarantee @ 1.1 Ur	pC	10
Circuit-breaker		
Manufacturer's name		TGS-V
Standard compliance		IEC 62271-100
Circuit breaker interrupting medium		Vacuum
Type of circuit-breaker		Fixed
Rated normal current	A	630A
Rated short circuit breaking current	kA	20/25
Rated duration of short circuit	s	1/3
DC component of rated short circuit breaking current	%	52
Rated out of phase breaking current	kA	5/6.25
Rated out of phase recovery voltage	kV	13.8/27.6
Rated line charging breaking current	A	10
Rated cable charging breaking current	A	25/31.5

Rated filling pressure for operation	MPa	0.04
Rated filling pressure for interruption	MPa	0.03
Rated operating sequence		O-0.3s-CO-180-CO
Maximum opening time	ms	50
Maximum break time	ms	10
Maximum closing time	ms	60
Maximum make time	ms	10
Electrical endurance class		E2
Capacitive restrike probability class		C2
Mechanical endurance class		M2
Switching class		S1
First pole-to-clear factor - terminal fault	p.u.	1.5
First pole-to-clear factor - out of phase	p.u.	2.5
Amplitude factor - terminal fault	p.u.	1.4
Amplitude Factor - out of phase	p.u.	1.25
TRV peak value, kpp - terminal fault	kV	20.6/41
TRV peak value, kpp - out of phase	kV	30.6/61
Time, t3 - terminal fault	us	61/87
Time, t3 - out of phase	us	118/174
Time Delay, td - terminal fault	us	9/13
Time Delay, td - out of phase	us	18/26
Voltage, u' - terminal fault	kV	6.9/13.7
Voltage, u' - out of phase	kV	10/20
Time, t' - terminal fault	us	29/42
Time, t' - out of phase	us	56/83
RRRV, uc/t3 - terminal fault	kV/us	0.34/0.47
RRRV, uc/t3 - out of phase	kV/us	0.26/0.35
Circuit breaker operating mechanism		Spring

Drive motor minimum and maximum operating voltage	V	110/220 AC/DC
Drive motor power consumption	W	120
Spring motor charging time	s	15
Method of tripping	-	Shunt Trip
Number of trip coil	-	Two
Trip coil minimum and maximum operating voltage	V	110/220 AC/DC
Trip coil current at rated voltage	A	1.7
Trip coil power consumption	W	374
Method of closing		Shunt closing
Number of close coil		One
Close coil minimum and maximum operating voltage	V	110/220 AC/DC
Close coil current at rated voltage	A	1.7
Close coil power consumption	W	374
No. of NO/NC auxiliary contact		2NO 2NC
Earthing switch		
Manufacturer's ref. code / make / type		TGS-E
Applicable standard	IEC	IEC62271-102
Rated short-time withstand current	kA	20/25
Rated duration of short circuit	S	1; 3
Short circuit making capability		E2
Mechanical endurance class		M1
Minimum isolating distance (live parts to earth)	mm	60
No. of NO/NC auxiliary contact		2NO 2NC
Disconnector switch		
Manufacturer's ref. code / make / type		TGS-D
Applicable standard	IEC	IEC62271-102
Rated normal current	A	630
Rated short-time withstand current	kA	20/25

Rated duration of short circuit	s	1; 3
Mechanical endurance class		M1
Minimum isolating distance (live parts to earth)	mm	60
Minimum isolating distance (clearance between open contacts)	mm	60
Motorized operation availability	-	Available
No. of NO/NC auxiliary contact	-	Up to 2NO 2NC
Fuse switch (If applicable)		
Manufacturer's type		TGS-F
Applicable standard	IEC	IEC62271-102
Rated normal current	A	200
Rated short-time withstand current	kA	20/25
Rated duration of short circuit	s	3 / 1
Mechanical endurance class		M1
Minimum isolating distance (live parts to earth)	mm	60
Minimum isolating distance (clearance bet. open contacts)	mm	60
Motorized operation		Available
No. of NO/NC auxiliary contact		2NO 2NC
Voltage transformer		
Applicable standard	IEC	IEC61869-3
Voltage transformer type		3 phase dry type
Voltage transformer primary and secondary ratios		11000V/110V
Voltage transformer secondary winding classes		0.5
MV cable compartment		
Cable compartment accessible side		Front
Cable connection height for functions (C/F/V)	mm	595/595/595
Cable termination type		Dry screened/unscreened
Cable testing facility		Optional
Maximum cable size per phase		300mm²
Maximum cable quantity per phase		2

4. Low voltage apparatus technical data

Low voltage ACB parameter		
Number of poles		3/4
Rated insulation voltage	V	1000
Rated frequency	Hz	50, 60
Rated operational voltage	V AC 50/60Hz	690
Rated current	A	630-1000 1250-1600 2000-3200
Ultimate breaking capability	kA	42 42 50
Service breaking capability	kA	35 35 40
Short- time withstand current	kA rms 1s	35 35 40

Note: Higher performance optional, consult us for more information.

Low voltage MCCB		
Rated current		3/4
Rated insulation voltage	V	800
Rated impulse voltage (Peak)	kA	8
Rated operational voltage	V	690
Ultimate breaking capability	V, kA	220-230: 85 380-400: 35
Service breaking Ics capability	% Icu	75-100

Note: Higher performance optional, consult us for more information.

Contact us

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