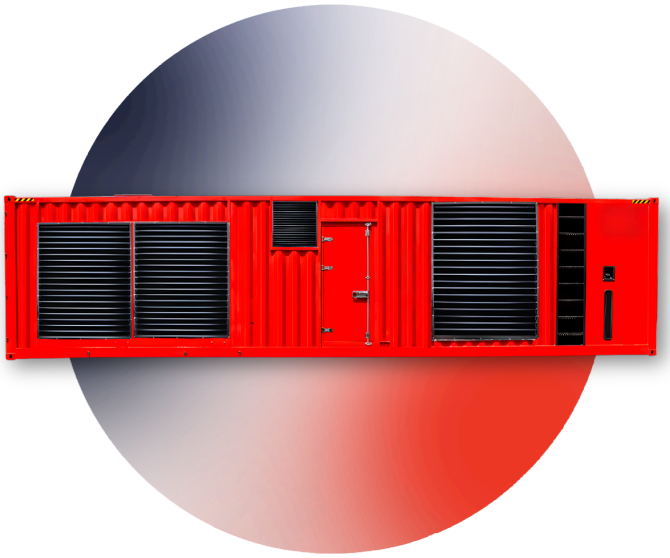
WHOLESALE DIESEL GENERATORS
A DIVISION OF NORTH STAR LOGISTICS LLC
661 Miller's Bluff RD, Surgoinsville, TN 37873
423-220-3500 Ext 2
sales@wholesale-generators.com
www.Wholesale-Generators.com

1000KW Cummins Natural Gas Generator

Container Type | Cummins Engine | 40HQ Enclosure

General

Model	WDG-1000-CUM-NG-2
Fuel Type	Natural Gas
Power Rating	1000 kW | 1250 kVA
Frequency	60 Hz
Voltage	Any voltage can be customized
Phase	Single Phase or Three Phase
Enclosure Type	Container Type
Engine Brand	Cummins
Alternator Brand	Leroy-Somer
Controller Model	DEIF AGC 150



Engine Data

Engine Model	Cummins K50N-G10S
Configuration	16-Cylinder
Aspiration	Turbocharged & Water-Air Intercooled
Bore x Stroke (in.)	6.26 x 6.26 in.
Displacement (L)	50.3 L
Compression Ratio	11.5:1
Cooling Method	Water Cooled

Alternator Data

Alternator Model	Leroy-Somer LSA52.2 ZL65
Type	PMG, Brushless
Voltage Regulation	AVR
Insulation System	Class H
Protection Level	IP23

Size & Dimensions

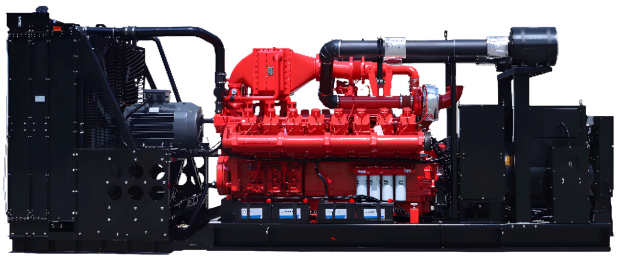
Dimensions (L x W x H)	480 x 96 x 102 (in.)
Net Weight (lbs.)	48,501

Other Features

- DEIF AGC 150 Controller equipped with Paralleling Function
- Gas Valve Train: MADAS DN80
- Full Copper Horizontal Radiator 50°C with Electric Fans
- 40HQ Container with Lighting & Electric Ventilation Fans
- Fire Alarm, Gas Leak Alarm & Heptafluoropropane Fire Suppression System
- Integrated HV Switchgear with ABB VD4/P 12.06.25 220V Vacuum Circuit Breaker
- Grounding Resistor Cabinet: PR 250-10
- UL Battery Charger
- 4 × 200Ah Varta Batteries with Cables, Rack & Battery Disconnect Switch
- Industrial Silencer & Anti-Vibration Mounts

Wholesale Diesel Generators

Cummins K50N-G10



ENGINE SPECIFICATION

BASIC DATA

Engine brand	CUMMINS
Engine model	K50N-G10
Displacement	50L
No. of cyl / arrangement	16V
Bore x stroke	159x159mm
Compression ratio	11.5:1
Engine speed	1800 rpm
Engine type	4-stroke Gas

EXHAUST SYSTEM

Exhaust stack gas temperature (max.)	473°C
Exhaust gas flow rate (max.)	3118 L/s
Exhaust system backpressure (maximum allowable)	10 kPa

FUEL SYSTEM

Maximum inlet pressure	10~30 kPa
Acceptable Fuel	Pipeline Quality Natural Gas
Minimum Fuel Methane Number	80 MN
Minimum Fuel Energy Content	30 MJ/m³

COOLING SYSTEM

Radiator air flow	TBA m³/min
Total oil capacity	234.7L
Total coolant capacity	450L

ELECTRICAL SYSTEM

Starter motor rated voltage	DC24V
Start battery	4x60Ah(720CCA)
Battery charging alternator	DC24V/TBA

INLET AIR

Air filter	Dry type
Max. combustion air Intake restriction	6.2kPa
Combustion air inlet flow rate	1370 L/S
Max. allowable combustion air inlet temp	50°C

NOTE: using dry processed gas natural gas fuel with 905 BTU/CUFT per standard cubic foot lower heating value.

CHONGQING CUMMINS ENGINE COMPANY LTD.
ENGINE DATA SHEET

ENGINE MODEL(S): K50N-G10S

CONTINUOUS: 1100kW(1475BHP)@1800RPM
CONFIGURATION D813004GX03

REFERENCE INFORMATION:
CPL CODE 644
DATA SHEET NUMBER..... FR270
DATE..... 2025/7/18

GENERAL ENGINE DATA

Type	4 Cycle , 60° Vee , 16 Cylinder	
Aspiration	Turbocharged and Aftercooled	
Bore—in.(mm)×stroke—in.(mm)	6.25×6.25	(159×159)
Displacement—in^3(L)	3069	(50)
Compression Ratio	11.5:1	
Wet Weight—lb(kg)	13911	(6310)
Moment of Inertia of Rotating Components without Flywheel —in-lbf-s^2(kg•m^2)	0.0	0.00
C.G. Distance From Rear Face of Block—in(mm)	47.5	(1206)
C.G. Distance From Engine Centerline to Left Side of Engine—in(mm)	0.0	(0)
C.G. Distance Above Crankshaft Centerline—in(mm)	11.0	(279)
Maximum Allowable Static Load at Rear Main Bearing—lb(kg)	2000	(907)

ENGINE MOUNTING

Maximum Bending Moment at Rear Face of Block—lb.ft(N•m)		(6101)
Maximum Crankshaft Thrust Bearing Load—lb.ft(N•m)	750	(3336)

EXHAUST SYSTEM

Minimum Back Pressure —in.Hg(kPa)	N/A	N/A
Maximum Back Pressure —in.Hg(kPa)	3	(10.0)

AIR INDUCTION SYSTEM

Maximum Allowable Intake Air Restriction		
with Clean Element —in.H_2O(kPa)	15	(3.7)
with Dirty Element —in.H_2O(kPa)	25	(6.2)

COOLING SYSTEM

Coolant Capacity		
Engine Only —U.S.Gal(L)	44	(165.5)
After-cooler Only —U.S.Gal(L)	7.7	(29.2)
Minimum Allowable Pressure Cap @ sea level— PSI(kPa)	7	(48)
Maximum Static Head of Coolant Above Engine Crank Centerline —ft.(m)	60	(18.3)
Acceptable Types of Deaeration System	Positive	
Jacket Water Circuit Requirements		
Maximum Coolant Friction Head External to Engine —PSI(kPa)	8	(55)
Maximum Coolant Temperature(Maximum Top Tank Temp) —°F(℃)	203	(95)
Thermostat (Modulating) Range —°F(℃)	(180-200)	82-93
Low Temperature Aftercooler (LTA) Circuit Requirements		
Maximum Coolant Friction Head External to Engine —PSI(kPa)	8	(55)
Maximum Coolant Temperature into the Aftercooler —°F(℃)	130	(54)
Thermostat (Modulating) Range —°F(℃)	(90-110)	32-43

LUBRICATION SYSTEM

Oil Pressure		
@ Minimum Low Idle —PSI(kPa)	20	(138)
@ Governed Speed —PSI(kPa)	50-70	(345-483)
Maximum Allowable Oil Temperature —°F(℃)	250	(121)
Total System Capacity (Including By-Pass Filter) —U.S.Gal(L)	62.0	(234.7)

FUEL SYSTEM

Minimum Fuel Inlet Pressure @ Inlet of GMF Sensor Housing—PSI(kPa)	1.5	(10)
Maximum Fuel Inlet Pressure @ Inlet of GMF Sensor Housing—PSI(kPa)	5.1	(35)
Maximum Fuel Pressure Variation—PSI(kPa)	+/-0.1	(+/-1)
Acceptable Fuel	Pipeline Quality Natural Gas	
Minimum Fuel Methane Number—MN	80	
Minimum Fuel Energy Content—BTU/scf(MJ/m^3)	800	(30)

CHONGQING CUMMINS ENGINE COMPANY LTD.
ENGINE DATA SHEET

ELECTRICAL SYSTEM AND START SYSTEM

System Voltage—V..... 24

Minimum Recommended Battary Capacity: Cold Soak at -18 °C (0 °F) or Above

·Engine Only Cold Cranking Amps—CCA..... 1800

·Engine Only Reserve Capacity—min..... 320

Maximum Allowable Resistance of Starting Circuit—Ω..... 0.002

Cold Start Capability

Unaided Cold Start

·Minimum Cranking Speed—rpm..... 150

·Minimum Ambient Temperature for Unaided Cold Start—°F(°C)..... 45 (7.2)

Cranking Torque at Minimum Unaided Cold Start Temperature—lb.ft(N•m)..... N/A N/A

PERFORMANCE DATA

All data is based on: -Engine operating with fuel system, water pump, lubricating oil pump, air cleaner and exhaust silencer; not included are battery charging alternator, fan, and optional driven components
-Engine operating with 905 BTU/scf fuel
-ISO 3046, Part 1, Standard Reference Conditions of:
Barometric Pressure: 100 kPa (29.53 in-Hg) Air Temperature: 25 °C (77 °F)
Altitude: 110 m (361 ft) Relative Humidity: 30%

Steady State Speed Stability at Any Constant Load—%..... +/- 0.75%

Governed Engine Speed—rpm..... 1800

Engine Idle Speed—rpm..... 900

	Continuous Power		
	100% Load	75% Load	50% Load
Gross Engine Power Output BHP(kW)	1475 (1100)	1106 (825)	737 (550)
Brake Mean Effective Pressure psi (kPa)	211 (1452)	158 (1089)	105 (726)
Intake Air Flow ft^3/min (L/s)	2926 (1381)	2250 (1062)	1562 (737)
Turbocharger Compressor Outlet Pressure in.Hg(kPa)	91 (309)	68 (231)	38 (127)
Turbocharger Compressor Outlet Temperature °F(°C)	428 (220)	361 (183)	257 (125)
Intake Manifold Pressure in.Hg(kPa)	53 (180)	32 (110)	12 (39)
Exhaust Gas Temperature °F (°C)	865 (463)	885 (474)	901 (483)
Exhaust Gas Flow CFM(L/s)	6780 (3200)	5395 (2546)	3852 (1818)
Air to Fuel Ratio (Mass Basis)	26.3:1	25.8:1	24.7:1
Heat Rejection to Ambient BTU/min(kW)	7568 (133)	5951 (105)	4299 (76)
Heat Rejection to Exhaust BTU/min(kW)	43036 (757)	33841 (595)	24446 (430)
Heat Rejection to Coolant BTU/min(kW)	47315 (832)	37161 (653)	26844 (472)
Engine Jacket Water Flow at gpm(L/min):			
• 5 psi External Friction Head	583 (2207)	583 (2207)	583 (2207)
• Maximum Friction Head	539 (2039)	539 (2039)	539 (2039)
Heat Rejected to Aftercooler coolant BTU/min(kW)	4550 (80)	3576 (63)	2583 (45)
Engine Aftercooler Water Flow at gpm(L/min):			
• 5 psi External Friction Head	111 (422)	111 (422)	111 (422)
• Maximum Friction Head	108 (409)	108 (409)	108 (409)

CHONGQING CUMMINS ENGINE COMPANY LTD.
ENGINE PERFORMANCE CURVE

CONFIGURATION	ENGINE MODEL:	CURVE NUMBER:	CPL CODE:
D813004GX03	K50N-G10S	FR270	644
			DATE: 2025/7/18

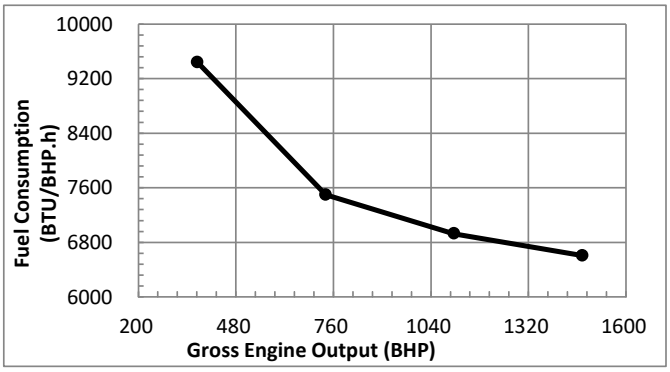
Displacement:	50.3L	(3067 in3)	Aspiration:	Turbocharged and Aftercooled	RATING
BoreXStroke:	159X159mm	(6.25X6.25 in.)	Fuel System:	Natural Gas	Continuous: 1100kW(1475BHP)@1800RPM
Compress Ratio:	11.5:1		Emission：	N.A.	

All data is based on the engine operating with fuel system,water pump, lubricating oil pump, air cleaner, and muffler; not included are alternator, fan, optional equipment and driven components. Coolant flows and heat rejection data based on coolant as 50% ethylene glycol/50% water. All data is subject to change without notice.

GROSS ENGINE POWER OUTPUT

SPEED	STANDBY POWER		PRIME POWER		CONTINUOUS POWER	
rpm	BHP	kW	BHP	kW	BHP	kW
1800	-	-	-	-	1475	1100
-	-	-	-	-	-	-

FUEL CONSUMPTION



OUTPUT POWER			CONSUMPTION		BFSC	
%	BHP	kW	BTU/min	MJ/h	BTU/BHP.h	MJ/kW.h
			1800RPM			
Continuous Power						
100	1475	1100	162401	10281	6606	9.3
75	1106	825	127702	8084	6928	9.8
50	738	550	92249	5840	7500	10.6
25	369	275	58054	3675	9440	13.4

Data shown above represents gross engine performance capabilities obtained and corrected in accordance with ISO-3046 conditions of 100 kPa (29.53 in-Hg) barometric pressure [110 m (361 ft) altitude], 25 °C (77 °F) air inlet temperature, and relative humidity of 30% using dry processed gas natural gas fuel with 905 BTU per standard cubic foot lower heating value.

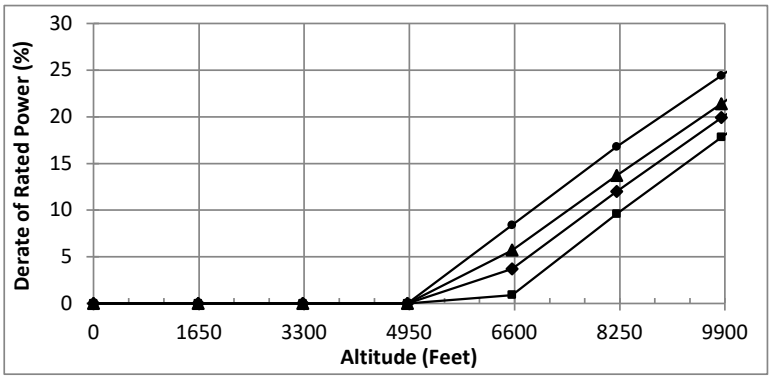
TECHNICAL DATA DEPT. **CERTIFIED WITHIN 5%** **CHIEF ENGINEER**

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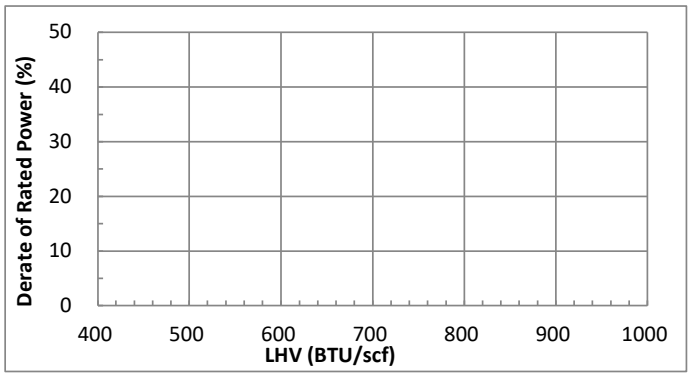
CHONGQING CUMMINS ENGINE COMPANY LTD.
ENGINE PERFORMANCE CURVE

CONFIGURATION	ENGINE MODEL:	CURVE NUMBER:	CPL CODE:
D813004GX03	K50N-G10S	FR270	644
			DATE: 2025/7/18

Altitude and Ambient Temperature Derate Curve



Engine Adjustments for Fuel Energy Content

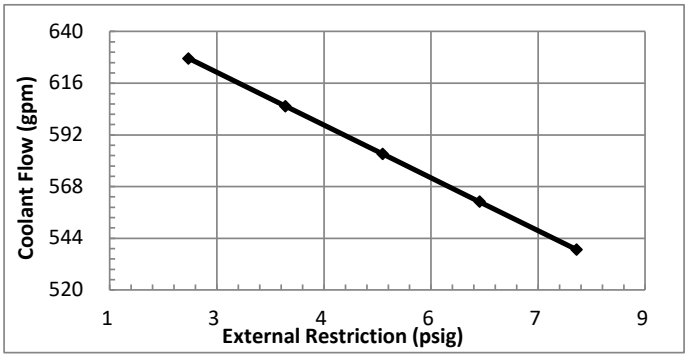


This rating should only be operated on minimum 886 BTU/scf Pipeline Natural Gas. Operation on fuel outside this range will result in poor engine performance, and is not recommended.

Aftercooler Coolant Pump Restriction Curve



Jacket Water Coolant Pump Restriction Curve



Data shown above represents gross engine performance capabilities obtained and corrected in accordance with ISO-3046 conditions of 100 kPa (29.53 in-Hg) barometric pressure [110 m (361 ft) altitude], 25 °C (77 °F) air inlet temperature, and relative humidity of 30% using dry processed gas natural gas fuel with 905 BTU per standard cubic foot lower heating value.

TECHNICAL DATA DEPT. | CERTIFIED WITHIN 5% | CHIEF ENGINEER

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ALTERNATOR TECHNICAL DESCRIPTION
LSA 52.2 ZL65 / 4p

LS Reference: test1

Date: 03-23-2023 V6.09b - 01/2022

Moteurs Leroy-Somer
Electric Power Generation
No.1 Aimosheng Road,Gaishan Town,Cangshan District - Fuzhou,Fujian ,350026 P.R.China
Donny.DOU@mail.nidec.com
+86 (21)62108056
DD

Main data C

Generator type:	**LSA 52.2 ZL65 / 4p**				
Power:	1 250	kVA	1 000 kWe	1 064	kWm
Voltage:	13 800	V	Star serial		
Rated voltage range:	+5/-5%				
Power factor - Lagging:	0,8				
Frequency:	60	Hz			
Speed:	1 800	rpm			
Nominal current:	52	A			
Winding type:	p5/6				
Classes (Insulation / Temperature Rise):	H / F				
Ambient temperature:	40	°C			
Altitude:	1 000	m			

Installation IEC Quantity 1

Prime mover:	Reciprocating engine
Manufacturer:	-
Type:	-
Duty:	Base Rating

Mechanical construction IM2001

Type of construction:	Two bearing
Mounting arrangement:	Horizontal Axis
Direction of rotation:	Clockwise (seen when facing the drive end - DE)
Bearing type:	Anti-friction
Bearing Lubrication:	Regreasable
Bearing insulation:	Not insulated
Shaft end type:	Cylindrical with keyway
Balancing - Class (ISO 1940/1):	Half key - G2,5 (std)
Flange:	SAE 00 / Length: 250 mm
Shaft height:	500 mm
Width:	750 mm

Additional specificities

Stabilized Runaway speed:	2 160	rpm - 2 min.

Cooling Method IC01

Degree of protection:	IP23
Coolant:	Air / Temperature: 40 °C
Air quality:	Clean
Ventilation (internal):	Self-ventilated
Filters:	Without
Ducting for air inlet:	No
Ducting for air outlet:	No

ALTERNATOR TECHNICAL DESCRIPTION
LSA 52.2 ZL65 / 4p

LS Reference: test1

Date: 03-23-2023 V6.09b - 01/2022

Connection, Excitation & Regulation

Parallel operation:	Island mode (0F) - no droop CT
Excitation:	Self-excited - Brushless - Type: PMG
Sustained 3-phase Isc:	> 3 x FLC for 10s.
AVR type:	Leroy Somer - D550 - Digital
AVR location:	In terminal box
Alternator Voltage sensing:	Terminal box mounted voltage sensing VTs

Terminal box

Power connection:	4 connectors (brought out neutral)
Main terminal box location:	1 terminal box on the top
Line side outlet:	Left hand side (seen when facing the drive end - D)
Gland plate:	Non magnetic, Undrilled
Auxiliaries	In main terminal box
	-

Protection and measurement accessories

Temperature detection

Stator windings:	6 x 3-wire PT100 RTDs
Combined guide and thrust bearing - DE:	1 x 3-wire PT100 RTD
Guide bearing - NDE:	1 x 3-wire PT100 RTD

Anti-condensation heating

Voltage: 230 V - 1Ph / Power: 500 W

Various items

Paint:	PE - Primary - RAL 7032
Documentation:	PDF manual
Documentation Language:	English

Controls

QUAL/INES/006 001	Measurement of winding resistance
QUAL/INES/006 021	Insulation check on sensors (when fitted)
QUAL/INES/006 002	Voltage balance and phase order check
QUAL/INES/006 007	Overspeed test (according to test bench limitation)
QUAL/INES/006 009	High potential test
QUAL/INES/006 010	Insulation resistance measurement

ALTERNATOR ELECTRICAL DATA
LSA 52.2 ZL65 / 4P

LS Reference: test1

Date: 03-23-2023

V6.09b - 01/2022

Main data:

Power:	**1 250**	kVA	**1 000**	kWe	**1 064**	kWm
Voltage:	**13800**	V	Frequency:		**60**	Hz
Rated voltage range:	+5% / -5%		Speed:		1800	rpm
Power factor - Lagging:	0,8					
Nominal current:	52	A	Phases		3	
Insulation / Temperature rise:	H / F		Connexion		Star serial	
Cooling:	**IC01**		Winding type:		p5/6	
			Winding:		- 6 Wires	
Ambient temperature:	40	°C				
Altitude:	1000	m	Overspeed (rpm)		2160	
Duty: Base Rating			Total Harmonic Distortion (THD) < 1,5%			

Efficiency (Base 1000 kWe) — IEC

	25%	50%	75%	**100%**	110%
Power factor - Lagging: 0,8	86,69	91,94	93,45	**93,97**	94,04
Power factor - Lagging: 1	87,10	92,59	94,32	**95,06**	95,22

Reactances (%) - (Base 1250 kVA)

Unitary impedance (1 per unit) = 152,352 ohms

		Direct axis *Unsaturated*	Direct axis *Saturated*		Quadrature axis *Unsaturated*	Quadrature axis *Saturated*
Synchronous reactance	Xd	169	154	Xq	86	78
Transient reactance	X'd	18,8	16,0	X'q	86	78
Subtransient reactance	X"d	10,5	8,9	X"q	13,1	11,1
Negative sequence reactance	X2	11,8	10,0			

X0	2,1	Zero sequence reactance
Xl	5,3	Stator leakage reactance
Xr	14,8	Rotor leakage reactance
Kc	**0,65**	Short-circuit ratio

Time constants (s)

	Direct axis		Quadrature axis	
Open circuit transient time constant	T'do	1,99	T'qo	NA
Short-circuit transient time constant	T'd	0,221	T'q	NA
Open circuit subtransient time constant	T"do	0,034	T"qo	0,113
Subtransient time constant	T"d	0,019	T"q	0,017

Ta	0,020	Armature time constant

Resistances (%)

Ra	1,6	Armature resistance	R0	0,7	Zero sequence resistance
X/R	5,7	X/R ratio (without unit)	R2	2,4	Negative sequence resistance

Voltage accuracy: 0,25%

Maximum inrush current for a voltage dip of 15%: 1304 kVA

when starting an AC motor having a starting power factor between 0 and 0.4

Rating is provided for the specified temperature rise, by resistance measurement according to IEC60034-1

According to: I.E.C. 60034.1 - 60034.2 - NEMA MG 1-32

Products and materials shown in this catalogue may, at any time, be modified in order to follow the latest technological developments,

ALTERNATOR MAIN CURVES
LSA 52.2 ZL65 / 4P

LS Reference: test1

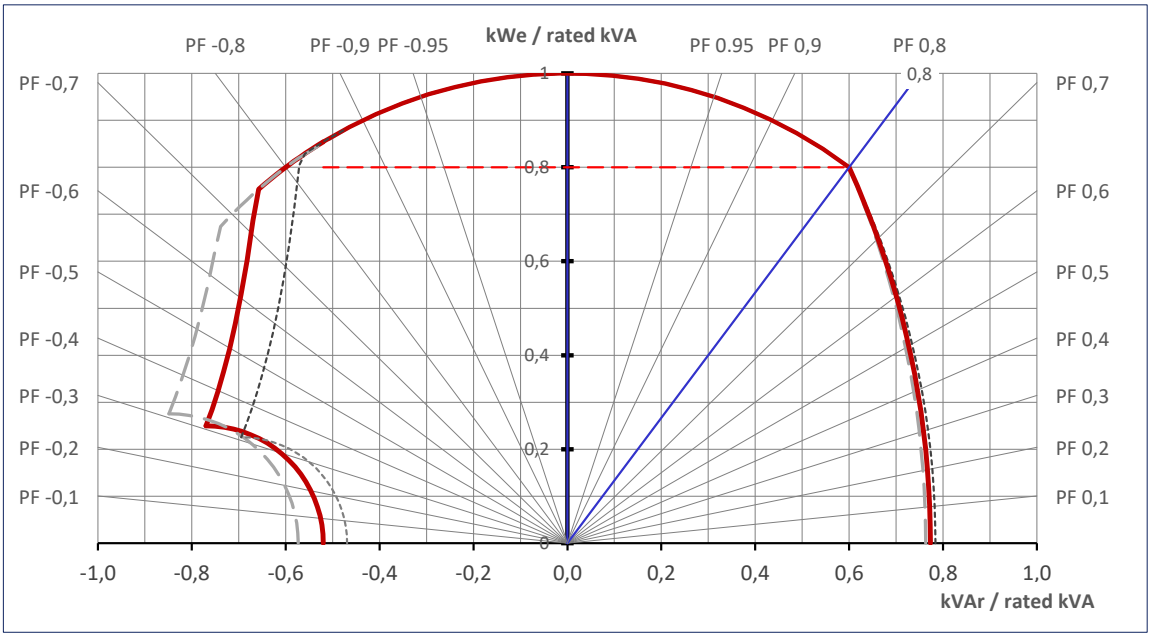
Date: 03-23-2023

1250kVA - 13800V - 60 Hz

V6.09b - 01/2022

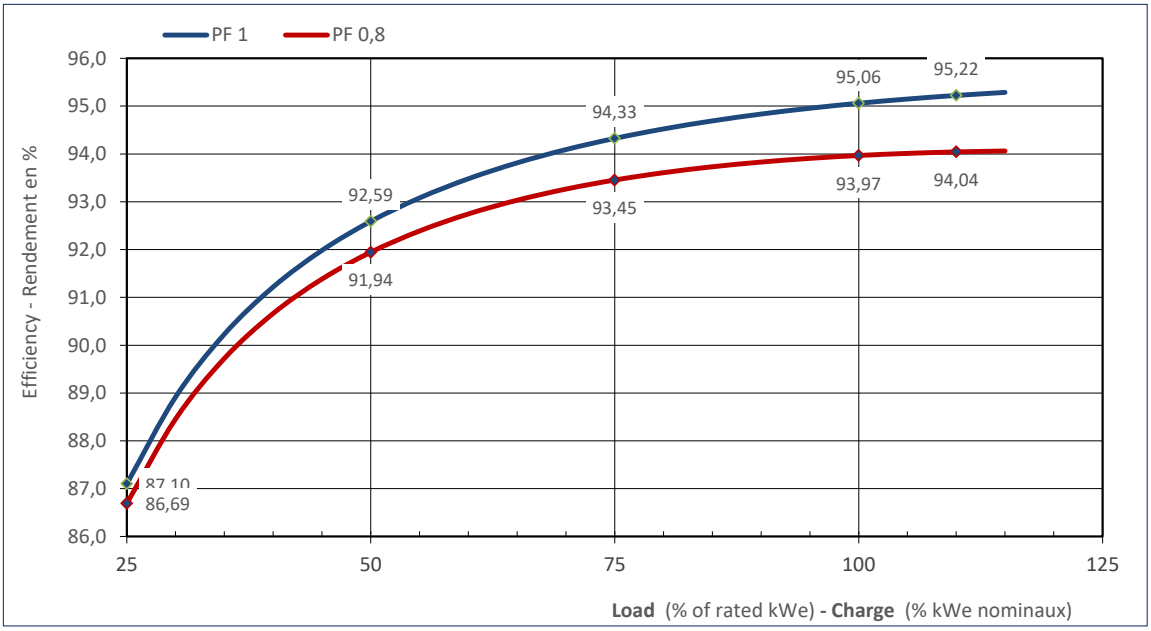
Capability Curve

Umax	+ 5%	14 490	V
Un		**13 800**	V
Umin	- 5%	13 110	V



Efficiency Curves

According to: IEC



ALTERNATOR MAIN CURVES
LSA 52.2 ZL65 / 4P

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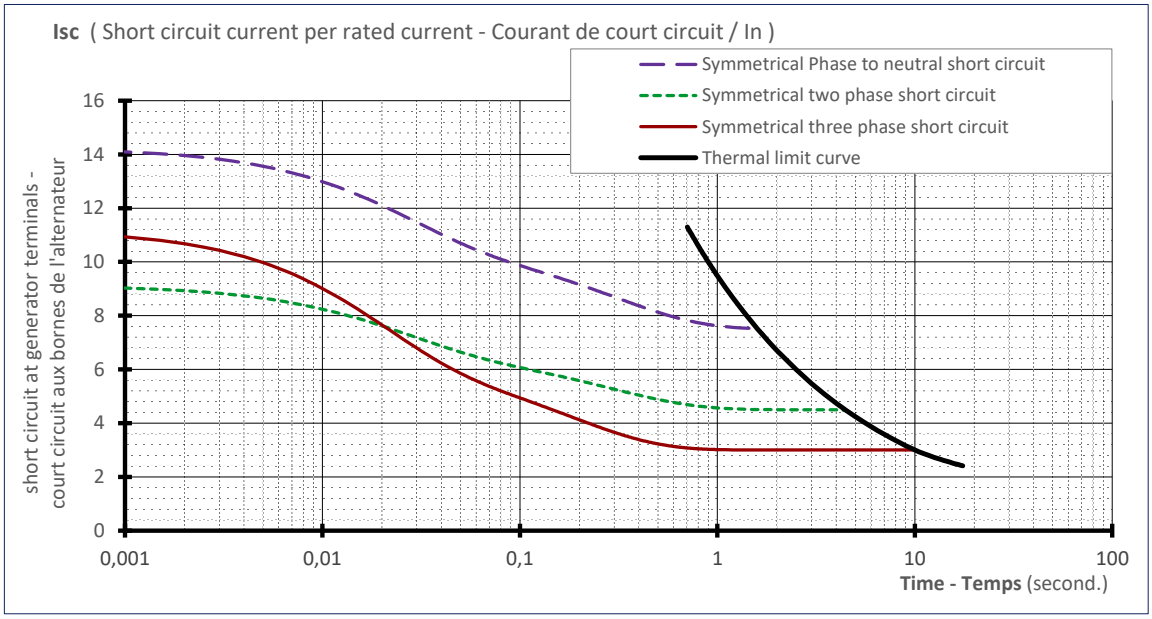
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1250kVA - 13800V - 60 Hz

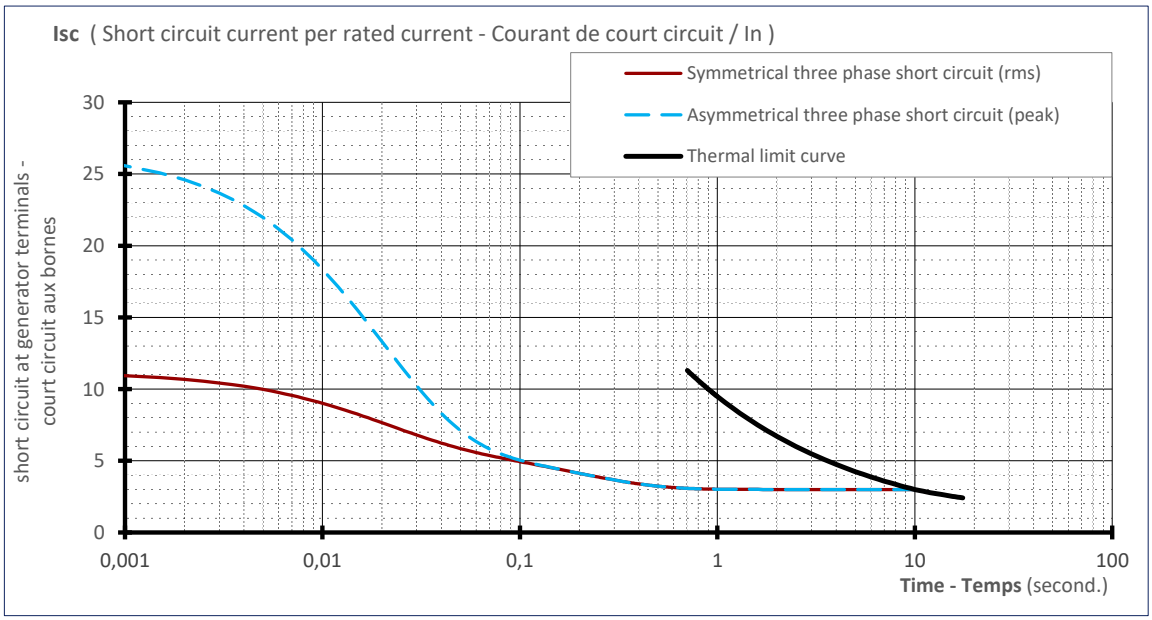
V6.09b - 01/2022

Stator Current decrement curves

Symmetrical phase to neutral short-circ	initial	733	A	14,1 x In		
Symmetrical two phase short-circuit	max	470	A	9 x In	In =	**52** A
Symmetrical three phase short-circuit	value	569	A	10,9 x In		
Thermal Limit						



Asymmetrical three phase short-circuit — IP — 1 326 A 25,5 x In



ALTERNATOR MAIN CURVES
LSA 52.2 ZL65 / 4P

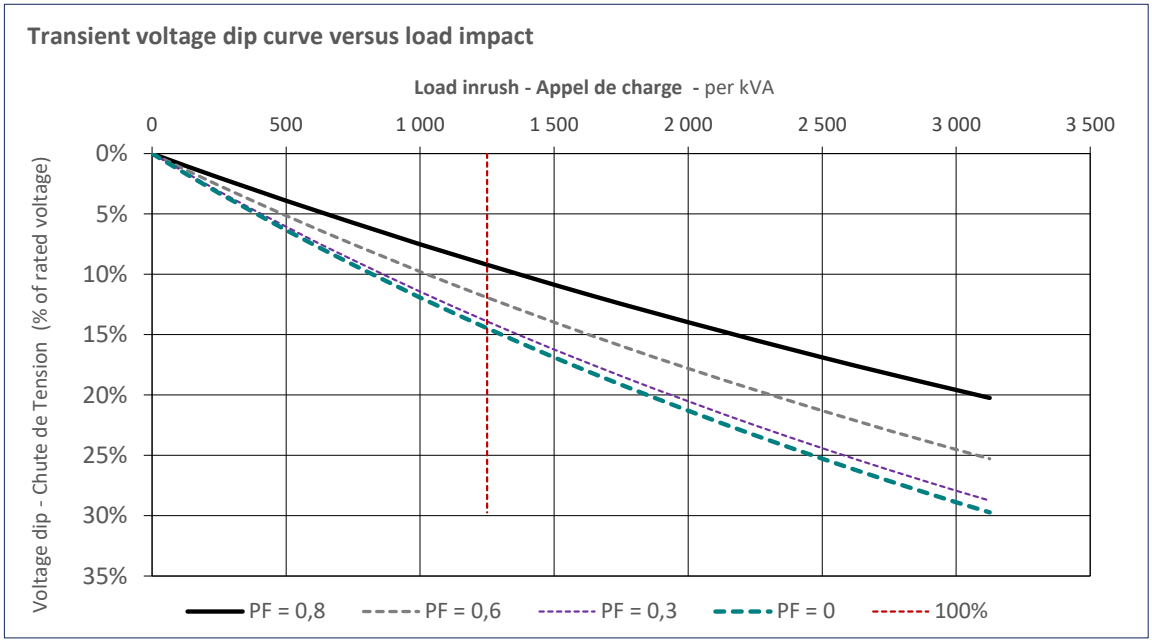
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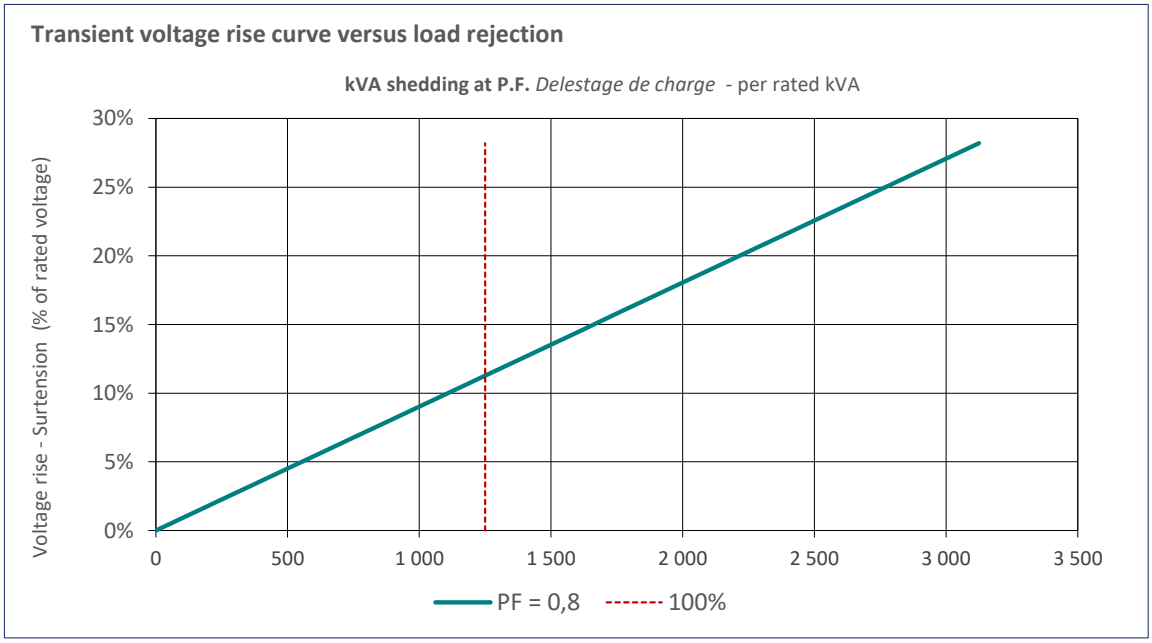
Date: 03-23-2023

1250kVA - 13800V - 60 Hz

V6.09b - 01/2022

Transient Voltage Variation





ALTERNATOR MAIN CURVES
LSA 52.2 ZL65 / 4P

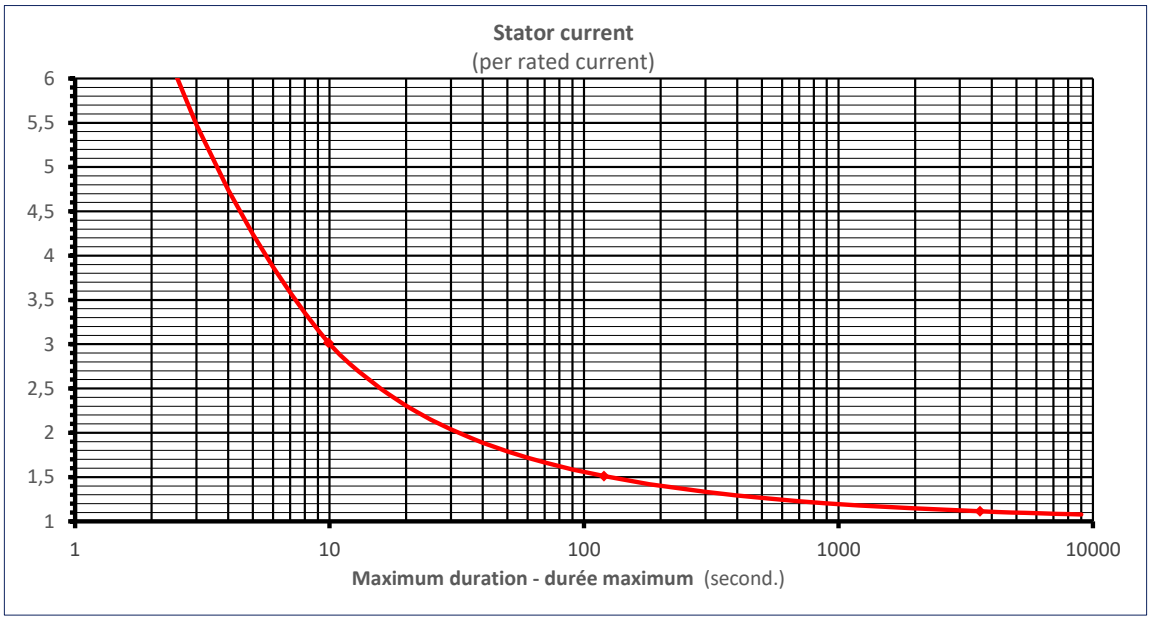
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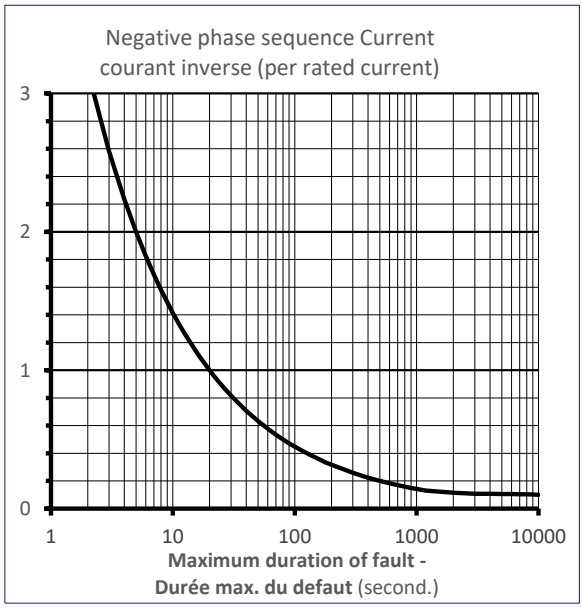
1250kVA - 13800V - 60 Hz

V6.09b - 01/2022

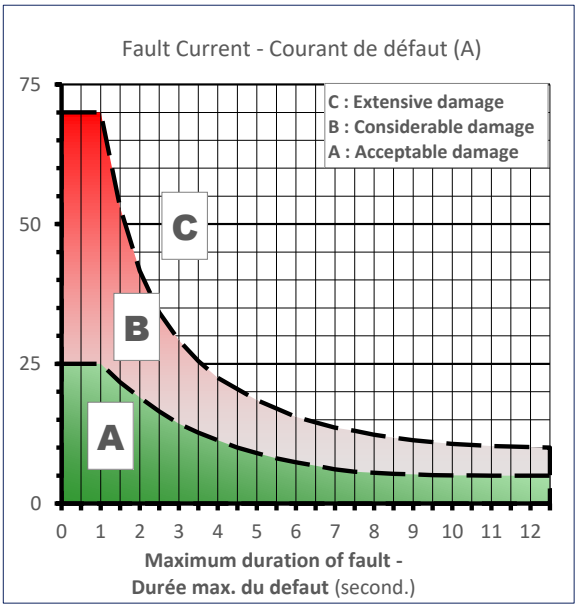
Thermal Damage Curve



Unbalance Load Curve



Stator Earth Fault Current



AGC 150 Generator



About AGC 150 Generator

In the simplest applications, you can use one AGC 150 Generator controller to control one genset.

Several AGC 150 controllers can work together to make a power management system (PMS). These applications include synchronisation, island operation, and running parallel to mains. The PMS can automatically start and stop gensets, and open and close breakers.

You can also use AGC 150 in power management systems with other DEIF controllers.

The AGC 150 Generator controller contains all the functions needed to protect and control a genset, and the genset breaker. If you do not use power management, the controller can also protect and control the mains breaker.

Easy and user-friendly display

- Configurable display pages
- Use the display buttons to operate the system
- Configurable shortcuts
- Adjustable mimics
- 20 configurable graphical screens
- Sunlight-readable LCD screen
- Supports multiple display languages
  - Including Chinese, Russian, and other languages with special characters

Emulation for testing and commissioning

- Use the emulation tool to verify and test the functionality of the application.
- Useful for training, customising plant requirements and for testing basic functionality that needs to be set up or verified.

Generator features

Stage V and Tier 4 final support

- AGC 150 meets the Tier 4 (Final)/Stage V requirements.
- Monitor and control the exhaust after-treatment system from the display

Compatibility

- Power management compatibility with a large range of AGC and ASC controllers
- Compatible with a wide range of equipment
  - For example, input/output expansion modules

Extensive range of supported protocols

- The AGC supports many controllers and engines

Remote display version

- Second display unit for the controller

Single controller

- Use a single controller to protect and control a genset, a genset breaker, and a mains breaker
- Useful for **rental** applications
- Requires a mains power measurement to do peak shaving, load take-over and MPE

Multiple controller applications

These applications can share the load without using power management. The generators do not automatically start, stop, connect, and disconnect.

- Analogue load sharing with external box
- Digital load sharing (CANshare)
  - Possible to have up to 128 gensets

Power management

The power management system:

- Automatically starts and stops generators
  - Load-dependent start and stop
- Automatically opens and closes breakers
- Optimises the fuel consumption
  - Asymmetrical load sharing
- Balances the loads in the system
- Uses plant logic
- Makes sure that the system is safe

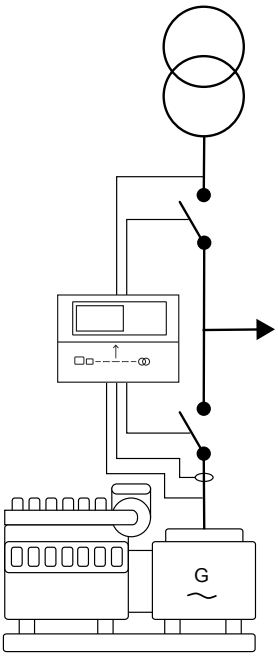
Energy/power management system

Use AGC 150 generator controllers with AGC 150 mains and AGC 150 BTB controllers for power management in a system with solar and storage controllers.

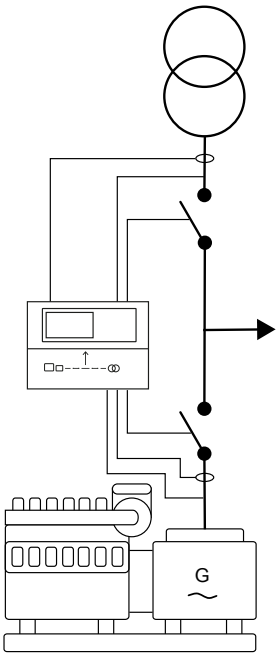
Graphical supervision page

You can monitor the complete power management system from a graphical supervision page in the utility software.

Single controller

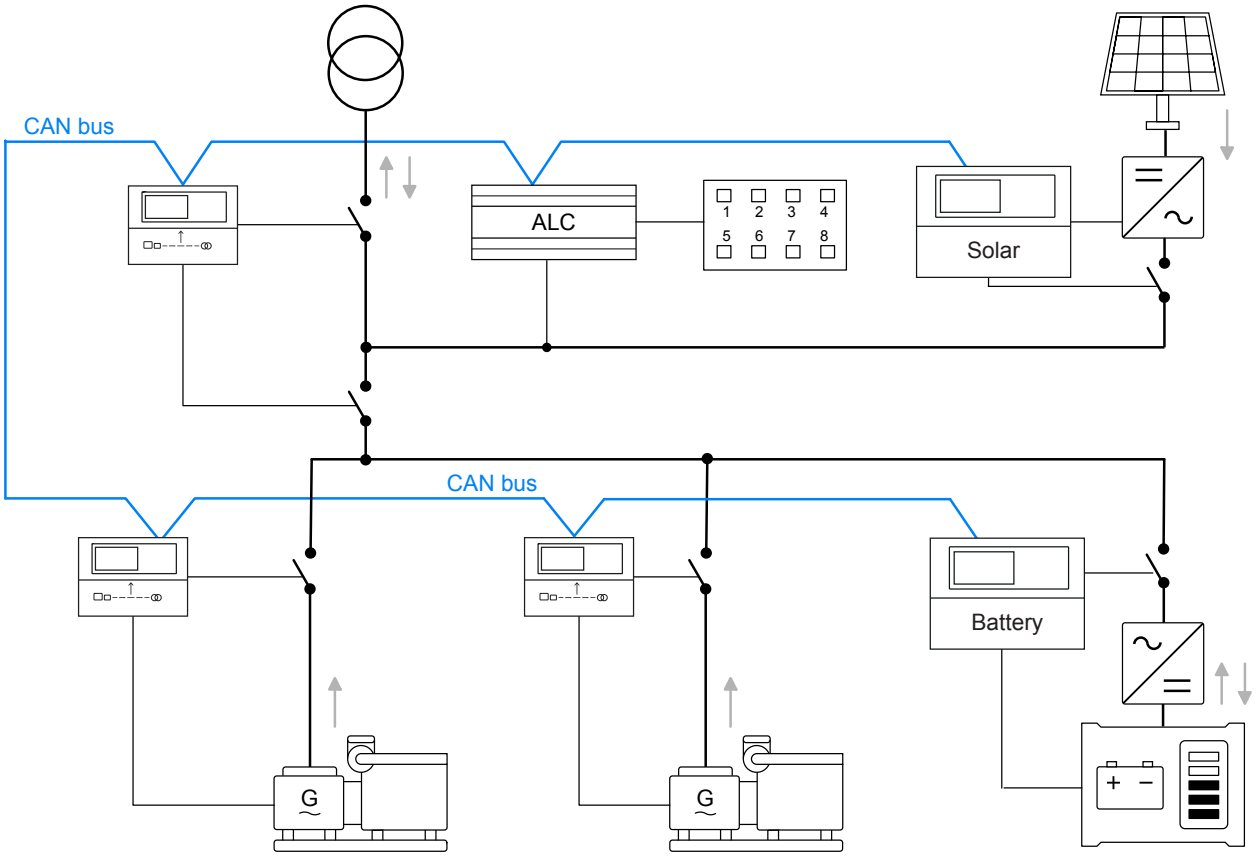


Automatic mains failure (AMF) and fixed power



Peak shaving, load take-over and mains power export

Power management



AGC 150 in power management with storage and battery controllers

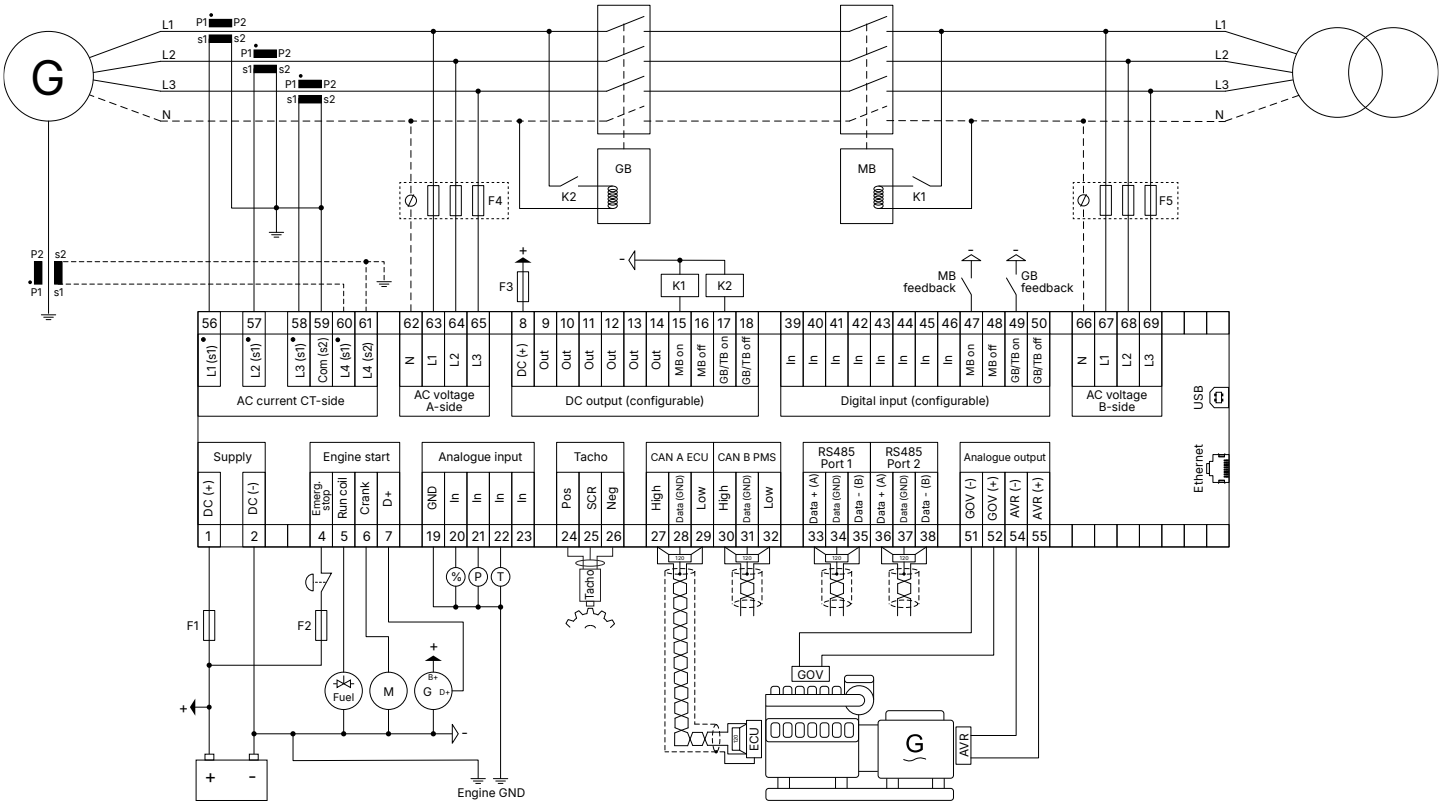
Key generator functions

- Engine start sequences
- Configurable run coil and crank for electric engine
- Support for diesel and gas gensets
- 3-phase genset and busbar sensing
- Phase compensation for D/Y transformer
- 4 x current sensing inputs
- Synchroscope and sync check
- Support for various digital voltage regulators
- Integrated governor and AVR outputs
- Voltage and frequency matching
- Three synchronisation methods: dynamic, static, and close before excitation
- Dead bus sensing
- Ground relay

Key generator functions

- Fuel usage monitoring
- Four configurable PID controllers
- Mains support for stand-alone systems (AMF)
- Maintenance alarms
- Controller configuration possible from the display or with PC tool
- PC tool with trending
- CAN flags between controllers
- CANbus based extension I/O module
- Real-time clock
- User-configurable logic (lite PLC)
- Event log with 500 entries
- Alarm log with 500 entries

Typical wiring for generator controller



Communication

- CAN A
- CAN B
- Engine communication using CAN bus
- RS-485 Port 1
- RS-485 Port 2
- RJ45 Ethernet
- USB

Approvals

- CE
- UL/cUL Listed to - UL/ULC6200:2019 1.ed. Controllers for Use in Power Production

See www.deif.com for the most recent approvals.

AC measuring

- Voltage: 100 to 690 V phase-to-phase (10 to 135 %), ±1 %
- Current: 1 A or 5 A (2 to 300 %), ±1 %
- Frequency: 3.5 to 75 Hz

Power supply

- Nominal voltage: 12/24 V DC
- Operating range: 6.5 to 36 V DC
- Load dump protection: ISO16750-2
- Operating range: 6.5 to 36 V DC

Inputs and outputs

- Digital inputs: 12 x (max. +36 V, min. -24 V)
- Digital outputs:
  - 2 x (15 A inrush, 3 A continuously)
  - 10 x (2 A inrush, 0.5 A continuously)
  - Common: 12/24 V DC
- 4 x analogue inputs
- 2 x analogue outputs
- CAN bus A and B
- RS-485 1 and 2
- RJ-45 Ethernet
- USB (service port)

Environmental specifications

- Operating temperature: -40 to +70 °C (-40 to +158 °F)
- Battery temperature: -40 to +85 °C (-40 to +185 °F)
- Altitude: 0 to 4000 m with derating
- Humidity: 20/55 °C at 97 %
- Protection degree: IP65 in panel, IP20 on terminals
- Pollution degree 2
- Self-extinguishing plastic

Protections

3 x Reverse power.....ANSI 32R
2 x Fast over-current.....ANSI 50P
4 x Over-current..... ANSI 50TD
2 x Over-voltage..... ANSI 59
3 x Under-voltage.....ANSI 27P
3 x Over-frequency..... ANSI 81O
3 x Under-frequency..... ANSI 81U
1 x Unbalance voltage.....ANSI 47
1 x Unbalance current.....ANSI 46
5 x Overload*.....ANSI 32F
1 x Inverse time earth over-current..... ANSI 50G
1 x Inverse time neutral over-current.....ANSI 50N
3 x Busbar/mains over-voltage..... ANSI 59P
4 x Busbar/mains under-voltage.....ANSI 27P
3 x Busbar/mains over-frequency.....ANSI 81O
3 x Busbar/mains under-frequency..... ANSI 81U
1 x Breaker open failure.....ANSI 52BF
1 x Breaker close failure..... ANSI 52BF
1 x Breaker position failure..... ANSI 52BF
1 x Phase sequence error..... ANSI 47
1 x Vector shift.....ANSI 78
1 x ROCOF df/dt.....ANSI 81R
2 x Directional over-current.....ANSI 67
1 x Negative sequence voltage high..... ANSI 47
1 x Negative sequence current high.....ANSI $46I_2$
1 x Power-dependent reactive power..... ANSI 40
1 x IEC/IEEE inverse time over-current.....ANSI 51
1 x Emergency stop
1 x Generator breaker external trip
Synchronisation failure alarms (1/breaker)
1 x De-load error
1 x Hz/V failure
1 x Not in Auto
2 x Under-voltage and reactive power, U and Q

NOTE * You can configure these protections for overload or reverse power.

For more information:
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Frisenborgvej 33, 7800 Skive, Denmark
Tel.: +45 9614 9614, info@deif.com
www.deif.com

DISTRIBUTION SOLUTIONS

VD4G

Medium voltage vacuum circuit breakers
15 kV - 1250...3150 A - 25...50 kA

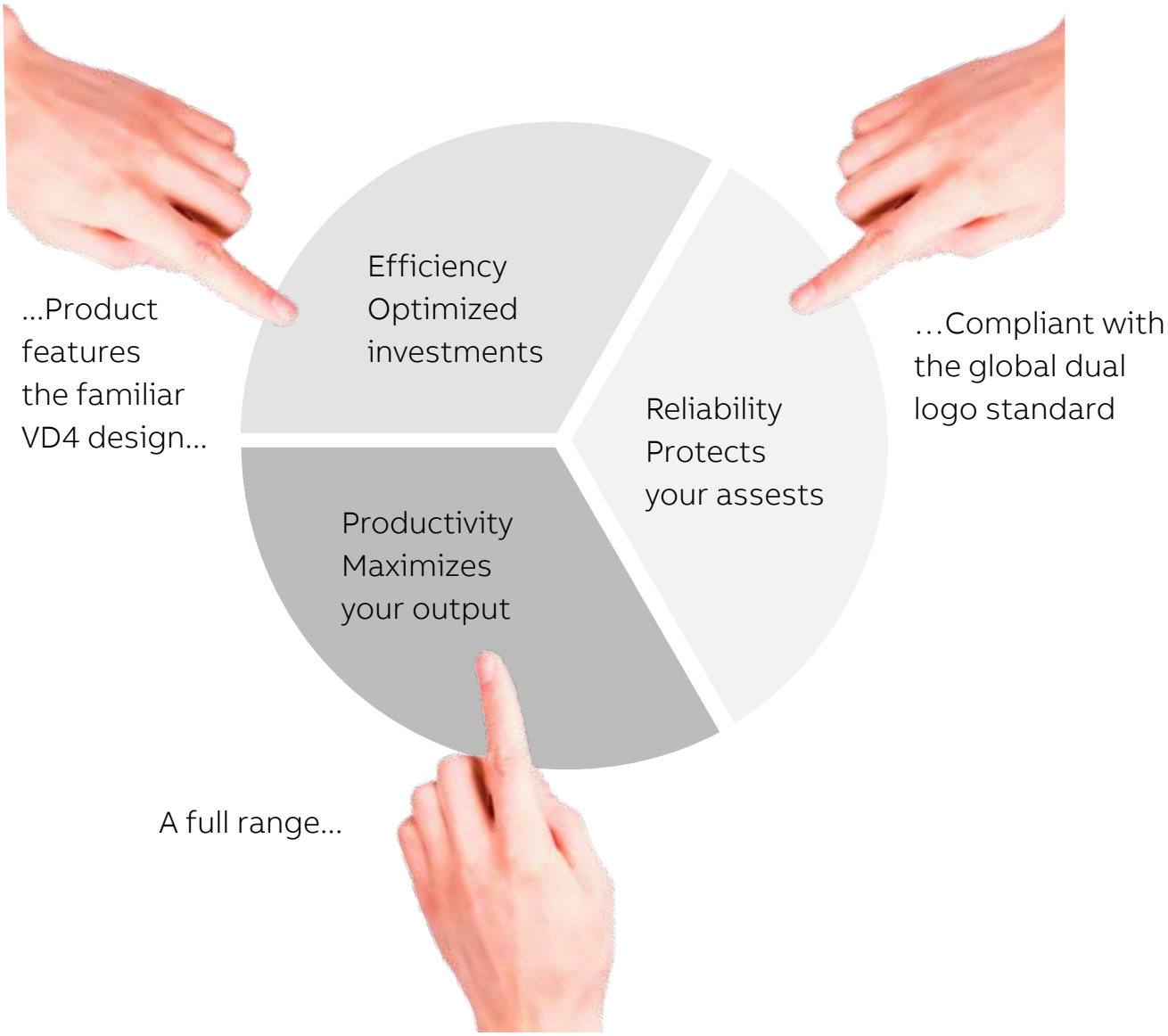


Vacuum circuit breakers for generator switching applications. A complete product line compliant with the latest Global Dual Logo IEC/IEEE 62271-37-013 Standard, featuring the familiar VD4 design for easy integration into existing installations.

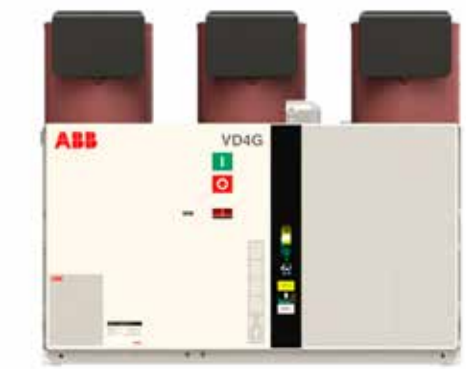
Index

001–005	**1. Values**
006–011	**2. Description**
012–025	**3. Selection and ordering**
026–026	**4. Specific product characteristics**
027–031	**5. Overall dimensions**
032–043	**6. Electric circuit diagram**

1. ABB strength, Your benefit



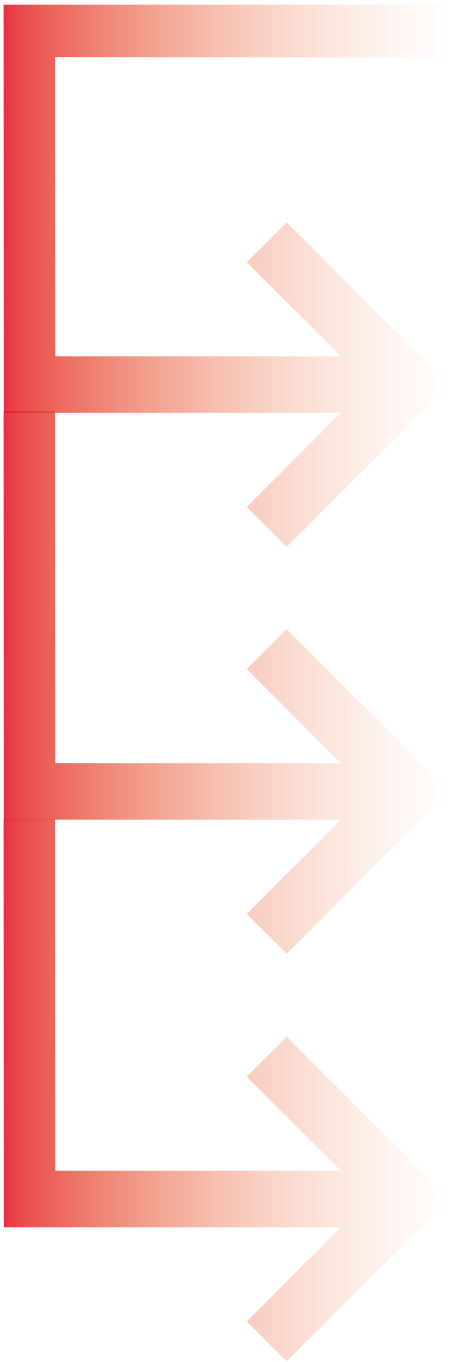






VD4G: Small footprint, complete protection

Thanks to the VD4G family you can:



Offer standardized solutions for all ratings, even when very low ratings or generator breakers are required.

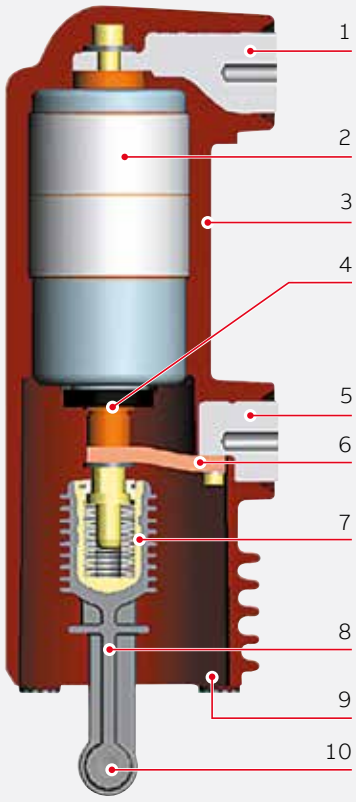
Comply with Specifications where Dual Logo-tested generator breakers are mandatory, thereby providing liability risk-free solutions.

Offer solutions using the same distribution CB compartment dimension, increasing benefit while optimizing maintenance and product know-how.

2. Description

The new VD4G family epitomizes ABB's renowned technology and excellence in designing and constructing vacuum interrupters embedded in poles and circuit breakers.
VD4G medium voltage circuit breakers use vacuum interrupters embedded in the poles. This construction technique makes the circuit breaker poles particularly sturdy and protects the interrupter from impact, dust and humidity. The vacuum interrupter houses the contacts and forms the interrupting chamber.

Vacuum interruption technique
The vacuum circuit breaker does not need a breaking and insulating medium. Thus, the interrupter does not contain ionizable material. The electric arc that generates when the contacts separate is merely formed by the fusion and vaporization of the contact material.
Sustained by the external energy, the electric arc persists until the current is annulled near the natural zero crossing. In that instant, the dielectric properties are very rapidly restored by a sharp reduction in the density of the conveyed charge and rapid condensation of the metallic vapor.



1 Upper terminal
2 Vacuum interrupter
3 Housing/pole
4 Stem of moving contact
5 Lower terminal
6 Flexible connection
7 Tie-rod spring fork
8 Tie-rod
9 Pole fastening
10 Connection to operating mechanism

Vacuum interrupter embedded in the pole

- Vacuum interruption technique
- Vacuum contacts protected against oxidation and contamination
- Vacuum interrupter embedded in the pole
- Interrupter protected against shocks, dust and humidity
- Operation under different climatic conditions
- Limited switching energy
- Stored energy operating mechanism with anti-pumping device supplied as standard equipment
- Simple customization with a complete range of accessories
- Fixed and withdrawable versions
- Compact dimensions
- Sealed-for-life poles
- Sturdy and reliable
- Limited maintenance
- Circuit breaker racked in and out with the door closed
- Incorrect and hazardous operations prevented thanks to special locks in the operating mechanism and truck
- High degree of environmental compatibility

Thus the vacuum interrupter restores the insulating capacity and the ability to sustain the transient recovery voltage, thereby definitively extinguishing the arc.
Since high dielectric strength can be reached in the vacuum even with minimum distances, circuit breaking is also guaranteed when the contacts separate a few milliseconds before natural zero crossing.
The special shape of the contacts and material used, combined with the brief arcing time and low arc voltage guarantee long-lasting contacts with a minimum amount of wear. The vacuum also prevents the contacts from tarnishing and becoming contaminated.

Operating mechanism
Along with short travel and low weight, the low speed of the contacts limits the energy required for operation, thus guaranteeing extremely limited wear in the system.
This ensures that the circuit breaker also requires very little maintenance.

VD4G circuit breakers use a mechanical operating mechanism, with stored energy and free trip. These characteristics allow opening and closing operations to be performed independent of the operator. The simply designed, user-friendly operating mechanism can be customized with a wide range of easily and rapidly installed accessories. Since it is so simple, the apparatus is more reliable.

Structure
The operating mechanism and poles are fixed to a metal frame, which also acts as the support for the fixed version of the circuit breaker. The compact structure is sturdy and ensures mechanical reliability.
Apart from the isolating contacts and cord with plug for connecting the auxiliary circuits, the withdrawable version has a truck for racking it into and out of the switchgear or enclosure with the door closed.

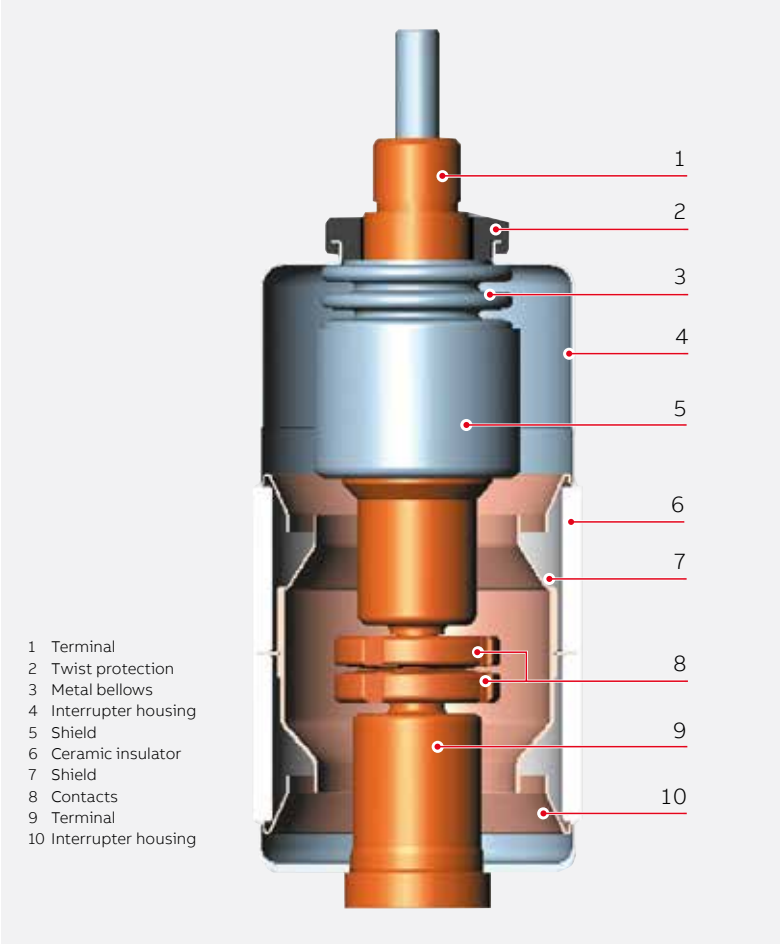






2. Description

Interruption principle of ABB interrupters



Vacuum interrupter

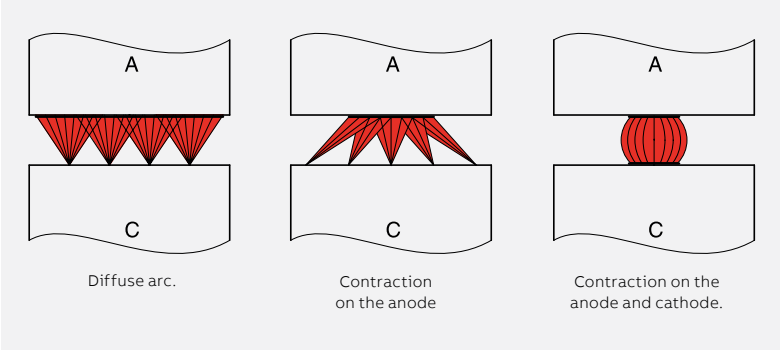
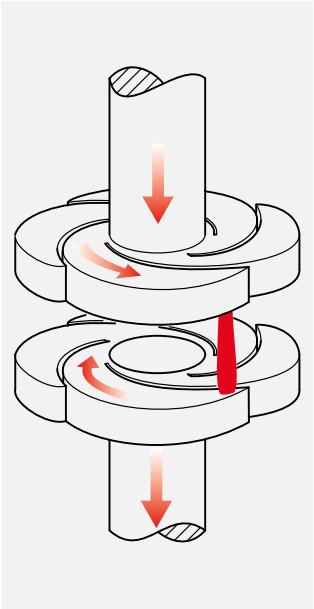


Diagram of transition from diffuse arc to contracted arc in a vacuum interrupter.

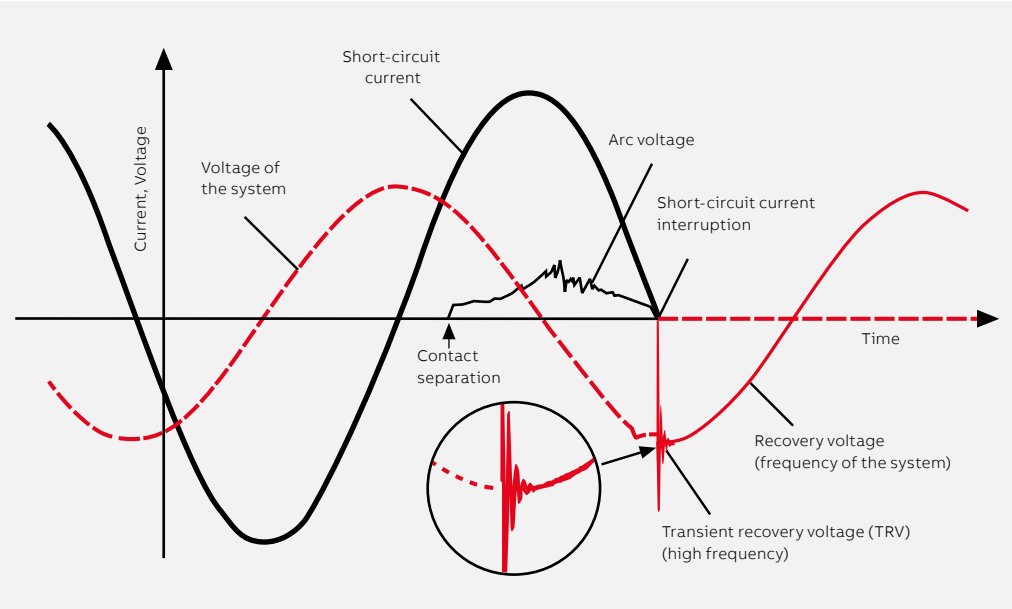
In a vacuum interrupter, an electric arc begins the instant in which the contacts separate. It persists until zero crossing is reached and can be influenced by magnetic fields.

Diffuse or contracted arc in a vacuum
Individual points of fusion form on the surface of the cathode following separation of the contacts. This leads to the formation of metallic vapors that support the arc itself.
The diffuse arcis characterized by expansion over the contact surface itself and by evenly distributed thermal stress.
The electric arc is always the diffuse type at the interrupter's rated current value. The contact is only eroded very slightly and the number of interruptions is very high.
As the value of the interrupted current increases (beyond rated value), the electric arc tends to change from diffuse to contracted owing to the Hall effect.
Starting out from the anode, the arc contracts and tends to concentrate as the current rises. There is a temperature rise on a level with the affected area and the contact is consequently subjected to thermal stress.
To prevent the contacts from overheating and becoming eroded, the arc is made to rotate. By turning, the arc resembles a moving conductor through which current passes.

The spiral contacts of ABB vacuum interrupters
Thanks to their special shape, spiral contacts generate a radial magnetic field in all areas of the arc column, which concentrates over the contact circumferences.
A self-generated electromagnetic force acts tangentially, causing the arc to rapidly rotate around the contact axis.
The arc is forced to rotate and involve a wider surface than that of a fixed contracted arc.
Besides minimizing thermal stress on the contacts, this makes contact erosion negligible and above all, allows the interruption process to be controlled even with very high short-circuits.
ABB vacuum interrupters interrupt at the natural zero crossing, thereby preventing the arc from restriking after that event.
A rapidly reduced current charge and rapid condensation of the metal vapors at the same time as zero crossing, allows maximum dielectric strength to be restored between the interrupter contacts within microseconds.



Geometry of radial magnetic field contact with a rotating vacuum arc.



Current and voltage trend evolution in a single phase during vacuum interruption.

2. Description

Vacuum circuit breakers for generator switching applications

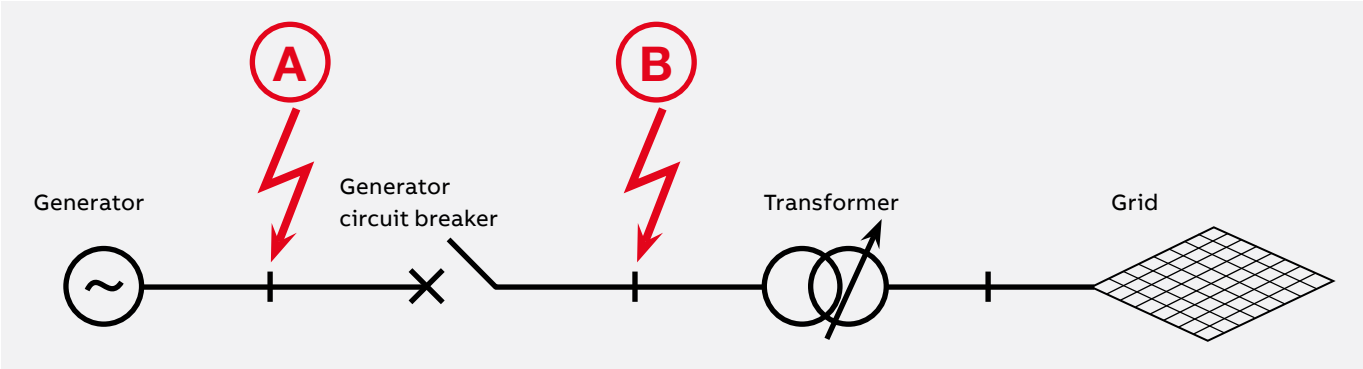


A complete product line compliant with the latest Global Dual Logo IEC/IEEE 62271-37-013 Standard, featuring the familiar VD4 design for easy integration into existing installations.

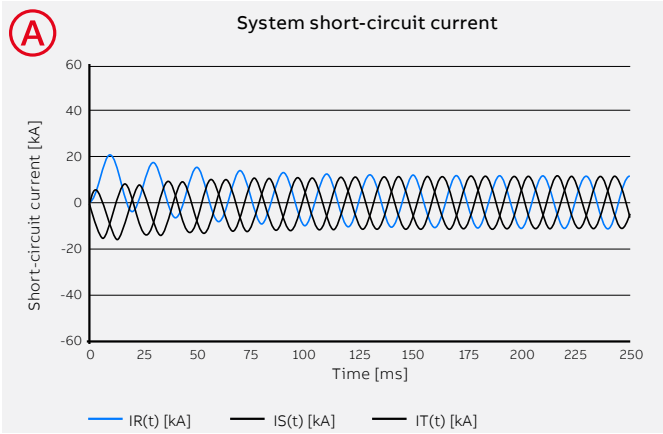
The VD4G breaker family is the first complete product line for generator switching applications developed in accordance with the most recent Dual Logo IEC/IEEE 62271-37-013 Standard.

Generator switching applications

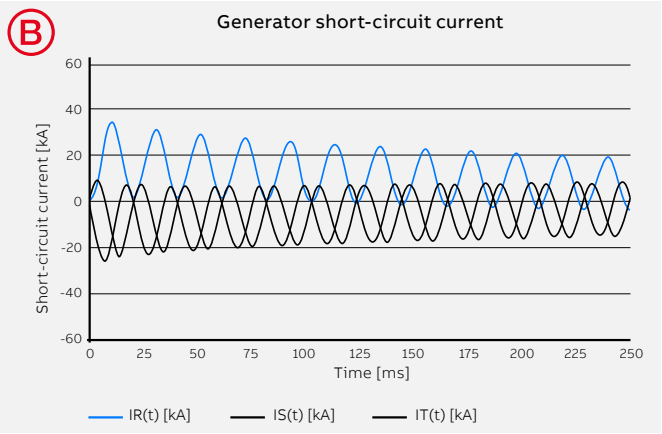
The globally expanding energy demand is increasingly covered by decentralized power plants and small installations using renewable resources. As the generated power is fed into the grid by step-up transformers and MV distribution boards, the VD4G family of vacuum circuit breakers offers a reliable and economical solution for protecting power plant assets.



Typical schematic of generator circuit breaker application



Failure location A: System-fed fault
Fast decaying DC component



Failure location B: Generator-fed fault
Slowly decaying and raised DC component results in delayed current zero.

The need to protect the grid as well as the generator from failures makes generator circuit breakers indispensable. The specific current shapes in this kind of application require dedicated circuit breakers tested for compliance with the specific duty defined by the latest Global Standard for Generator applications.
Each generator plant has specific technical characteristics. It is essential to perform a suitability analysis of the generator circuit breaker application for the purpose of selecting the solution most able to fully meet your needs and ensure plant safety.

Versions available

VD4G circuit breakers are available in fixed and withdrawable versions with front operating mechanism.
The withdrawable version is available for UniGear ZS1, switchgear enclosures.

Fields of application

VD4G circuit breakers are used in power generation systems for generation for the full protection of power generation assets.

Standards

VD4G circuit breakers conform to IEC /IEEE 62271-37-013 Standards.
VD4G circuit breakers undergo the tests indicated below and guarantee the safety and reliability of the apparatus in service in any installation.

- **Type tests:** temperature rise, power frequency insulation withstand voltage, lightning impulse insulation withstand voltage, short-time and peak withstand current, mechanical life, short-circuit current making and breaking capacity.
- **Individual tests:** insulation of the main circuits with voltage at power frequency, auxiliary circuit and operating mechanism insulation, measurement of the main circuit resistance, mechanical and electrical operation.

Service safety

Safe distribution switchgear can be created with VD4G circuit breakers thanks to the complete range of mechanical and electric locks available on request.
The locking devices have been designed to prevent incorrect operations and allow the installations to be inspected whilst guaranteeing maximum operator safety.
The key locks and padlocks enable opening and closing and/or racking in and out operations to be performed.
The closed door racking-out device only allows the circuit breaker to be racked into or out of the switchgear with the door closed.
Anti-racking-in locks prevent circuit breakers with different rated currents from being racked in, and racking-in and out operations with the circuit breaker closed.

- Complete product line fully compliant with the latest Global Dual Logo IEC/IEEE 62271-37-013 Standards
- Same familiar VD4 design for easy integration into existing installations.
- Highly reliable operating mechanisms thanks to a low number of components manufactured by mass production systems
- Limited and simple maintenance
- Electrical accessories that can be easily and quickly installed or replaced thanks to wiring pre-engineered with plug-socket connectors
- Mechanical anti-pumping device included in standard equipment
- Built-in closing spring loading lever

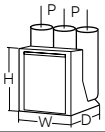
Accessories

VD4G circuit breakers are available with a full range of accessories to suit all installation requirements.
The operating mechanism has a standardized range of accessories and spare parts which are easy to identify and order.
The accessories are installed conveniently from the front of the circuit breaker. Plug-socket connectors are used for the electrical connections.
Operation and maintenance of the apparatus are simple and require limited use of resources.

3. Selection and ordering
Fixed circuit breakers

Fixed VD4G circuit breakers (15 kV)



Circuit breaker			**VD4G-25/16**
Standards		IEC/IEEE 62271-37-013	•
Rated voltage		Ur [kV]	15
Rated insulation voltage		Us [kV]	15
Withstand voltage at 50 Hz	common value	Ud (1 min) [kV]	38
Impulse withstand voltage	common value	Up [kV]	95
Rated frequency		fr [Hz]	50-60
Rated nominal current (40° C)		Ir [A]	1250
Rated system-source short-circuit breaking current	Symmetrical short-circuit current	IscSFF [kA]	25
	DC component of rated short-circuit breaking current *	%	74
	Asymmetrical system-source short-circuit current	IascSFF [kA]	36.5
Rated generator-source short-circuit breaking current	symmetrical short-circuit current Iscg Class G1	IscGFF [kA]	16
	DC component of generator-source short-circuit breaking current Class G1	%	110
	symmetrical short-circuit current Iscg Class G2	IscGFF [kA]	16
	DC component of generator-source short-circuit breaking current Class G2	%	130
Rated breaking current under out-of-phase conditions	symmetrical short-circuit current	IscOOP [kA]	12.5
	DC component of rated short-circuit breaking current	%	74
Making current		Ip [kA]	68.5
Rated operating sequence during short-circuit interruption			CO-10 min-CO
Rated short-time withstand current (3s)		Ik [kA]	25
Opening time		[ms]	33...60
Maximum arcing time (generator-source fault - 130% DC component at contact separation)		[ms]	40
Closing time		[ms]	30...60
Maximum overall dimensions		H [mm]	461
		W [mm]	450
		D [mm]	424
		Pole distance P [mm]	150
Weight		[kg]	73
Standardized table of dimensions			1VCD003891
Operating temperature		[°C]	- 5 ... + 40

(1) 4000 A with forced ventilation

Types of fixed circuit breakers available

The circuit breakers can be completed with the optional accessories indicated on the following pages.

Fixed VD4G circuit breaker (15 kV)						
Ur	**Isc**	**Rated current (40 °C) [A]**				
kV	**kA**	H = 461 D = 424 P = 150 W = 450	H = 610 D = 459 P = 210 W = 600	H = 636 D = 459 P = 275 W = 750	H = 636 D = 459 P = 275 W = 750	**Circuit breaker type**
15	25	1250				VD4G-25 15.12.25 p150
	40		2000			VD4G-40 15.20.40 p210
	40			2000		VD4G-40 15.20.40 p275
	40				3150	VD4G-40 15.32.40 p275
	50				3150	VD4G-50 15.32.50 p275

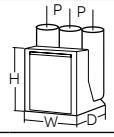
W = Width of circuit breaker.
D = Depth of circuit breaker.
u/l = Distance between bottom and top terminal.
l/g = Distance between bottom terminal and bearing surface of circuit breaker.
P = Horizontal center distance of pole.

VD4G-40/25				**VD4G-50/50**	
•				•	
15				15	
15				15	
38				38	
95				95	
50-60				50-60	
2000	2000	3150	4000(1)	3150	4000(1)
40				50	
74				74	
58.5				73	
25				50	
110				110	
25				37	
130				130	
20				25	
74				74	
115				137	
CO-10 min-CO				CO-10 min-CO	
40				50	
33...60				<30	
34				33	
30...60				<55	
610	610	636	636	636	636
600	750	750	750	750	750
459	459	459	459	459	459
210	275	275	275	275	275
146	158	177	177	210	210
1VCD000240	1VCD000241	1VCD000242			
- 5 ... + 40				- 5 ... + 40	

3. Selection and ordering
Withdrawable circuit breakers

Withdrawable circuit breakers
for Unigear ZS1 switchgear (15 kV)



Circuit breaker			**VD4G-25/16**
Standards		IEC/IEEE 62271-37-013	•
Rated voltage		Ur [kV]	15
Rated insulation voltage		Us [kV]	15
Withstand voltage at 50 Hz	common value	Ud (1 min) [kV]	38
Impulse withstand voltage	common value	Up [kV]	95
Rated frequency		fr [Hz]	50-60
Rated nominal current (40° C)		Ir [A]	1250
Rated system-source short-circuit breaking current	Symmetrical short-circuit current	IscSFF [kA]	25
	DC component of rated short-circuit breaking current *	%	74
	Asymmetrical system-source short-circuit current	IascSFF [kA]	36.5
Rated generator-source short-circuit breaking current	symmetrical short-circuit current Iscg Class G1	IscGFF [kA]	16
	DC component of generator-source short-circuit breaking current Class G1	%	110
	symmetrical short-circuit current Iscg Class G2	IscGFF [kA]	16
	DC component of generator-source short-circuit breaking current Class G2	%	130
Rated breaking current under out-of-phase conditions	symmetrical short-circuit current	IscOOP [kA]	12.5
	DC component of rated short-circuit breaking current	%	74
Making current		Ip [kA]	68.5
Rated operating sequence during short-circuit interruption			CO-10 min-CO
Rated short-time withstand current (3s)		Ik [kA]	25
Opening time		[ms]	33...60
Maximum arcing time (generator-source fault - 130% DC component at contact separation)		[ms]	40
Closing time		[ms]	30...60
Maximum overall dimensions		H [mm]	632
		W [mm]	503
		D [mm]	664
		Pole distance P [mm]	150
Weight		[kg]	116
Standardized table of dimensions			1VCD000233
Operating temperature		[°C]	- 5 ... + 40

(1) 4000 A with forced ventilation

Types of withdrawable circuit breakers available for UniGear ZS1 switchgear

The circuit breakers can be completed with the optional accessories indicated on the following pages.

Withdrawable VD4AG circuit breaker (15 kV)						
Ur	**Isc**	**Rated current (40 °C) [A]**				
kV	**kA**	H = 461 D = 424 P = 150 W = 450	H = 610 D = 459 P = 210 W = 600	H = 636 D = 459 P = 275 W = 750	H = 636 D = 459 P = 275 W = 750	**Circuit breaker type**
15	25	1250				VD4G/P-25 15.12.25 p150
	40		2000			VD4G/P-40 15.20.40 p210
	40			2000		VD4G/P-40 15.20.40 p275
	40				3150	VD4G/P-40 15.32.40 p275
	50				3150	VD4G/P-50 15.32.50 p275

W = Width of circuit breaker.
D = Depth of circuit breaker.
u/l = Distance between bottom and top terminal.
l/g = Distance between bottom terminal and bearing surface of circuit breaker.
P = Horizontal center distance of pole.

VD4G-40/25				VD4G-50/50	
•				•	
15				15	
15				15	
38				38	
95				95	
50-60				50-60	
2000	2000	3150	4000(1)	3150	4000(1)
40				50	
74				74	
58.5				73	
25				50	
110				110	
25				37	
130				130	
20				25	
74				74	
115				137	
CO-10 min-CO				CO-10 min-CO	
40				50	
33...60				<30	
34				33	
30...60				<55	
691	691	730	730	735	735
681	853	853	853	851	851
643	643	643	643	650	650
210	275	275	275	275	275
190	205	221	221	270	270
1VCD000234	1VCD000243	1VCD000244			
- 5 ... + 40				- 5 ... + 40	

3. Selection and ordering
Optional accessories for VD4G up to 40 kA

1 Shunt opening release (-MBO1)
Allows opening command of apparatus to be enabled by remote control.
This release is suitable for both instantaneous and permanent duty. However, an auxiliary contact -BGB1 de-energizes it after circuit breaker has opened. In the case of instantaneous service, the current impulse must last at least 100 ms.
This release can be controlled by the following devices: coil continuity control (CCC), opening circuit supervision (TCS)(*) or the ABB STU functionality control device (see accessory 16, supplied on request).

Characteristics	
Un	24-30-48-60-110...132-220...250 V DC
Un	48-60-110...127-220...250 V AC 50-60 Hz
Operating limits	65 ... 120% Un
Inrush power (Ps)	60...100 W / VA
Continuous power consumption (Pc)	1.5 W
Electronics self-consumption (no coil supplied); value independent of voltage applied	1.5 mA
Opening time	33...60 ms
Insulation voltage	2000 V 50 Hz (for 1 min)

(*) The minimum current that the relay with TCS function (used for monitoring coil continuity) detects as a condition denoting that the trip circuit is operating correctly (specified for each relay in the relative manual), must be sensibly higher than the current consumption of the actual coil (~1.5 mA). If this fails to occur, always add, in parallel to the TCS, a circuit able to absorb sufficient current to compensate the gap while preventing the total current in the TCS circuit from rising above the maximum threshold (Itcs <10 mA for High Voltage coils - from 110V to 250V, and Itcs <50 mA for Low Voltage coils from 24 V to 60 V). A simple resistor can be sized for the purpose, depending on the parameters of the TCS and the auxiliary voltage range used.

2 Additional shunt opening release (-MBO2)
Similarly to shunt opening release -MBO1, this allows the opening command of the apparatus to be transmitted by remote control. It can be powered by the same circuit as main shunt opening release -MBO1 or by a circuit that is completely separate from release -MBO1.
This release is suitable for both instantaneous and permanent duty. However, an auxiliary contact -BGB1 de-energizes it after the circuit breaker has opened.
To guarantee the release action, the current impulse must last at least 100 ms.
Continuity functionality can be checked with a continuity control device (CCC), opening circuit supervision (TCS)(*) or the STU functionality control device (see accessory 16, supplied on request).
- MBO2 has the same electrical and operating characteristics as release -MBO1.





3 Opening solenoid (-MO3)

The opening solenoid (-MO3) is a special demagnetization release to be used in conjunction with a self-supplied overcurrent protection relay.
It is situated in the operating mechanism (left-hand side) and is not an alternative to the additional shunt opening release (-MO2).
It is not available for 40 and 50 kA circuit breakers.
Should this accessory be required, it must be requested at the time of order since subsequent application by the customer is not possible.
Note: the compatible protection relays are listed in document: Data sheet 1VCD600854.
The opening solenoid (-MBO3) is available in two versions:

- For DC (release by discharging energy stored in protection relay against self-supplied overcurrent)
- For AC (release by means of the energy supplied by an adder transformer on the secondaries of the protection current transformers) (CT is at customer's charge)

(*) The minimum current that the relay with TCS function (used for monitoring coil continuity) detects as a condition denoting that the trip circuit is operating correctly (specified for each relay in the relative manual), must be sensibly higher than the current consumption of the actual coil (~1.5 mA).
If this fails to occur, always add, in parallel to the TCS, a circuit able to absorb sufficient current to compensate the gap while preventing the total current in the TCS circuit from rising above the maximum threshold (Itcs < 10 mA for High Voltage coils - from 110V to 250V, and Itcs < 50 mA for Low Voltage coils from 24 V to 60 V).
A simple resistor can be sized for the purpose, depending on the parameters of the TCS and the auxiliary voltage range used.

4 Shunt closing release (-MC)

Allows closing command of apparatus to be transmitted by remote control.
This release is suitable for both instantaneous and permanent duty. An auxiliary contact that de-energizes it after the circuit breaker has closed is not envisaged.
The permanently supplied release provides the electrical anti-pumping function with both electrical opening and re-closing commands maintained. To guarantee the closing action, the current impulse must last at least 100 ms.
If there is the same supply voltage for shunt closing release -MBC and under-voltage release -MBU and the circuit breaker must close automatically when auxiliary voltage returns, there must be a delay of at least 50 ms between under-voltage release energizing and energizing of the shunt closing release to allow the closing operation to take place. Continuity functionality can be checked with a continuity control device (CCC), opening circuit supervision (TCS)(*) or the STU functionality control device (see accessory 16, supplied on request).

Characteristics	
Un	24-30-48-60-110...132-220...250V DC
Un	48-60-110...127-220...250V AC 50-60Hz
Operating limits	65 ... 120% Un
Inrush power (Ps)	60...100 W/VA
Continuous power consumption (Pc)	1.5 W
Electronics self-consumption (no coil supplied; value independent of voltage applied	1.5 mA
Opening time	33...60 ms
Insulation voltage	2000V 50Hz (for 1 min)





3. Selection and ordering
Optional accessories

5 Auxiliary contacts of the circuit breaker (-BGB1) for 12 to 24 kV versions

Electrical signaling of circuit breaker open/closed can be obtained with a group of 10, 16 or 20 auxiliary contacts for the fixed version and 10 or 16 auxiliary contacts for the withdrawable version. The standard equipment comprises 10 auxiliary contacts.

Note

The following are available using the standard group of ten auxiliary contacts and the maximum number of electrical accessories:

- for fixed circuit breakers: three closing contacts "a" for signaling circuit breaker open and five opening contacts "b" for signaling circuit breaker closed;
- for withdrawable circuit breakers: three closing contacts "a" for signaling circuit breaker open and four opening contacts "b" for signaling circuit breaker closed;
- Fixed circuit breakers are available with two finishing accessories (to be specified when ordering):
  - non-wired auxiliary contacts; wiring to the terminals of the contacts is at the customer's charge (photo below left; the terminal box to which the other electrical accessories are wired is at the top); ask for instructions 1VCD601204 (available in the main languages) which describe how to remove, wire the auxiliary contacts more easily and fit the auxiliary contacts unit back into its housing;
  - auxiliary contacts already wired to the terminal box (see photo at top right)

Consult circuit diagrams 1VCD400151 for fixed circuit breakers and 1VCD400155 for withdrawable circuit breakers.

Note

The main shunt opening release and/or the additional shunt opening release use 1 and/or 2 closing contacts "a", thereby reducing the number of auxiliary contacts available. Always check the maximum number of contacts available if the equipment is non-standard.







The new layouts can be interchanged with the existing ones, with the following exceptions:
- diagram 1VCD400151 (substitutes 1VCD400046 and 1VCD400099)
- fig. 34 on the previous diagrams is represented by fig. 31 + fig. 32 on the new diagram;
- fig. 33 and fig. 35 on the previous diagrams are not available with the new layout
- diagram 1VCD400155 (substitutes 1VCD400047)

Auxiliary contacts –BGB1 conform to the following standards/regulations/directives:
- IEC 62271-100
- IEEE C37.54
- EN 61373 cat.1 class B / impact and vibration test
- Germanish Loyd regulation / vibrations envisaged by the shipping registers
- UL 508
- EN 60947 (DC-21A DC-22A DC-23A AC-21A)
- RoHS Directive

General characteristics	
Insulation voltage to standard VDE 0110, Group C	660 V AC 800 V DC
Rated voltage	24 V ... 660 V
Test voltage	2 kV for 1 min
Maximum rated current	10 A - 50/60 Hz
Breaking capacity	Class 1 (IEC 62271-1)
Number of contacts	5
Groups of contacts	10 / 16 / 20
Contact travel	90°
Actuating force	0.66 Nm
Resistance	<6.5 mΩ
Storage temperature	–30 °C ... +120 °C
Operating temperature	–20 °C ... +70 °C (-30° ref. ANSI 37.09)
Contact overtemperature	10 K
Mechanical life	30,000 mechanical operations
Protection class	IP20
Cable section	1 mm²

Electrical characteristics (according to IEC 60947)		
Rated current Un		Breaking capacity (10000 interruptions)
220 V AC	Cosφ = 0.70	20 A
220 V DC	Cosφ = 0.45	10 A
24 V DC	1 ms	12 A
	15 ms	9 A
	50 ms	6 A
60 V DC	1 ms	10 A
	15 ms	6 A
	50 ms	4.6 A
110 V DC	1 ms	7 A
	15 ms	4.5 A
	50 ms	3.5 A
220 V DC	1 ms	2 A
	15 ms	1.7 A
	50 ms	1.5 A
250 V DC	1 ms	2 A
	15 ms	1.4 A
	50 ms	1.2 A

Electrical characteristics (according to IEC 62271-100 class 1)	
Rated current Un	Breaking capacity
24 V DC 20 ms	18.8 mA
60 V DC 20 ms	7.4 mA
110 V DC 20 ms	4.2 mA
250 V DC 20 ms	1.8 mA

3. Selection and ordering
Optional accessories

6 Transient contact (-BGB4)
This contact closes momentarily (duration >30 ms) upon circuit breaker opening controlled remotely with a shunt opening release.
The indication is not provided when opening is manual and local. A contact (–BGB11) is activated by the manual push-button and cuts off the transient contact closure (–BGB4).
The transient contact is activated directly from the main operating shaft when the indication is provided only on actual opening of the main circuit breaker contacts.

7 Position contact (-BGT3)
This contact is used together with the locking magnet in operating mechanism (-RLE1) to prevent remote closing during racking into the unit.
It is only supplied for withdrawable circuit breakers for UniGear ZS1 switchgear and PowerCube modules.
It cannot be supplied when the transmitted contacts are required in the truck (-BGT1; -BGT2).





8 Transmitted contacts in truck (-BGT1; -BGT2)
Transmitted contacts of withdrawable circuit breaker (installed in circuit breaker truck - only for VD4/P withdrawable circuit breaker).
These contacts are provided either in addition or as an alternative to the position contacts (for signaling circuit breaker racked out) located in the unit. They also perform the function of position contact (-BGT3).
Contacts -BGT1 and BGT2 have the same general and electrical characteristics as auxiliary contacts.

9 Motor operator (-MAS)
The motor operator automatically loads the closing spring of the circuit breaker operating mechanism. After the circuit breaker has closed, the geared motor immediately reloads the closing springs.
In a power failure or during maintenance work, the closing spring can always be loaded by hand (using the special crank handle built into the operating mechanism).

Characteristics		
Un	24...30 - 48...60 - 110...130 - 220...250 V–	
Un	100...130 - 220...250 V~ 50/60 Hz	
Operating limits	85 ... 110% Un	
Power on inrush (Ps)	≤ 40 kA	50 kA
	DC = 600 W; AC = 600 VA	DC = 900 W; AC = 900 VA
Rated power (Pn)	DC = 200 W; AC = 200 VA	DC = 350 W; AC = 350 VA
Loading time	0.2 s	0.2 s
Loading time	6-7 s	6-7 s
Insulation voltage	2000 V 50 Hz (for 1 min)	2000 V 50 Hz (for 1 min)





3. Selection and ordering
Optional accessories

10 Contact for signaling closing spring loaded/ discharged (-BGS2)

Consists of a microswitch which remotely signals the state of the closing spring of the circuit breaker operating mechanism.
The following signals can be transmitted:
- contact open: signaling spring loaded
- contact closed: signaling spring discharged

The two signals must be used for circuits with the same power supply voltage.

11 Locking magnet on operating mechanism (-RLE1)

Only allows activation of the command with the supplied electromagnet.
The locking electromagnet in the operating mechanism has the same electrical characteristics as shunt closing release -MBC.





Protections and locks

12 Locking magnet on truck (-RLE2)
This accessory is compulsory for withdrawable circuit breakers for UniGear ZS1 switchgear and PowerCube modules. Prevents circuit breaker racking into the switchgear when the auxiliary circuit plug is disconnected.
This plug also acts as an anti-insertion lock when the rated currents differ from each other. Special striker pins prevent the plug from being fitted into the socket if the rated current of the circuit breaker is lower than the rated current of the panel.
This accessory is not available when the motor-operated truck is required.

Characteristics	
Un	24 - 30 - 48 - 60 - 110 - 125 - 127 - 132 - 220 - 240 V–
Un	24 - 30 - 48 - 60 - 110 - 125 - 127 - 220 - 230 ... 240 V~ 50/60 Hz
Operating limits	85 ... 110% Un
Nominal power (Pn)	DC 250 W; AC = 250 VA
Continuous power (Pc)	DC = 5 W; AC = 5 VA
Inrush duration	150 ms
Insulation voltage	2000 V 50 Hz (for 1 min)

13 Interlock for fixed circuit breaker
Device for fixed circuit breakers converted into withdrawable ones by the customer. It allows the customer to make a mechanical lock to prevent racking-out/in with the circuit breaker closed, and the circuit breaker from closing as it travels.
Note: The device must be requested when ordering since it must be assembled and tested in the factory.





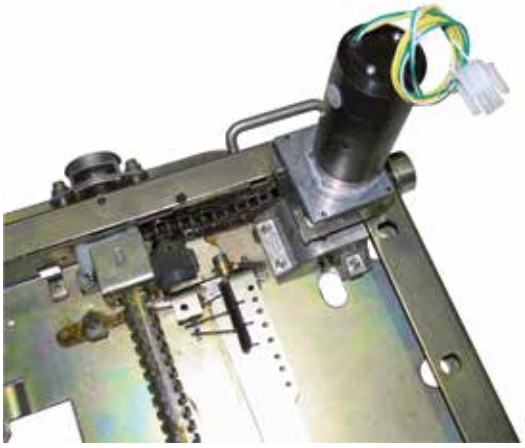
3. Selection and ordering
Optional accessories

14 Mechanical door interlock
This device prevents circuit breaker racking-in when the switchgear door is open. It is only provided for circuit breakers used in UniGear ZS1 switchgear and PowerCube modules fitted with a special actuator on the door.

15 Motor-operated truck (-MAT)
Allows the circuit breaker to be racked into and out of the switchgear via remote control (only withdrawable circuit breakers for UniGear ZS1 switchgear and PowerCube modules).
The motor version with clutch can be ordered on request and allows racking-in/ out to be performed in an emergency if the truck motor fails to operate.

Characteristics	
Un	24 - 30 - 48 - 60 - 110 - 220 V–
Operating limits	85 ... 110% Un
Rated power (Pn)	40 W





16 STU Shunt Test Unit

Owing to their construction, the functionality of the shunt closing (-MBC) and opening (-MBO1, -MBO2) releases cannot be checked with dedicated relays (e.g. TCS Test Control Supervision, CCC Control Coil Continuity) or with the REF control and protection unit. The only device able to check this functionality is the STU Shunt Test Unit. Please contact us if you want to check this functionality using devices other than STU.

This device can be used in conjunction with shunt opening release (-MBO1; -MBO2) or shunt closing release (-MBC) for the purpose of checking functionality and continuity.

The Shunt Test Unit is used to check the continuity of releases with rated operating voltage between 24 V and 250 V (AC and DC), as well as the functionality of the electronic circuit of the release.

Continuity is checked cyclically with an interval of 20 seconds between one test and the next.

LEDs on the front provide optical signals. The following information is given:

- POWER ON: power supply present
- (-MO) TESTING: test in progress
- TEST FAILED: signal given if a test fails or in the absence of auxiliary power supply
- ALARM: signal given after three failed tests.

Two relays and a changeover contact are also available on the unit for remote signaling of the following two events:

- test failure (resetting occurs automatically when the alarm stops)
- failure of three tests (resetting can only be performed by means of the manual - RESET – button from the front of the unit).

There is also a manual - RESET – button on the front of the unit.

Characteristics	
Un	24 ... 250 V AC/DC
Maximum interrupted current	6 A
Maximum interrupted voltage	250 V AC



4. Specific product characteristics

Environmental protection program

VD4 circuit breakers are manufactured in accordance with ISO 14000 Standards (Guidelines for environmental management).
The manufacturing processes take place in compliance with the environmental protection standards as to reduced energy consumption, use of raw materials and the production of waste. Production complies with the environmental management system implemented in the medium voltage apparatus manufacturing facility.
Assessment of the environmental impact of every stage in a product's life cycle is a method used by ABB to develop environmentally compatible components and systems. This goal is pursued by minimizing energy consumption and the overall use of raw materials. A policy that begins when the products are designed by targeted selection of materials, processes and packing.
This means that components can be reused and materials recycled when a product has reached the end of its useful life.

Optional accessories for VD4G-50

Designation	Item No.	Rated supply voltage
Auxiliary switch (with clamp-type terminal)	-BGS1 -BGB1 -BGB2 -EGB3	
Auxiliary switch on locking magnet	-BGL1	
Auxiliary switch for fault signaling	-BGB4	
1st shunt release OFF	-MBO1	24 V ··· 240 V DC
2nd shunt release OFF	-MBO2	110 V ··· 240 V AC
Shunt release ON	-MBC	24 V ··· 240 V DC
Locking magnet	-RLE1	110 V ··· 240 V AC
Undervoltage release with spring mechanism	-MBU	24 V ··· 240 V DC
Delayed undervoltage release with spring mechanism	-MBU	see RNSU for supply voltage
Indirect overcurrent release with intermediate current transformer and spring mechanism	-MBO3	24 V ··· 240 V DC
Intermediate current transformer for indirect overcurrent release		24 V ··· 220 V DC
Magnet holder, complete (with integrated rectifiers -TB4, -TB1, -TB3, -TB2)		24 V ··· 220 V DC
Series rectifier	-TB6/-TB7	
Loading motor (with gearing)	-MAS	24 V ··· 240 V DC 110 V ··· 240 V AC
Push-on sleeve 4.8-2.5 for push-on blade 0.8 thick (for additional external connections)		

Spare parts for VD4G up to 40 kA

- Shunt opening release
- Additional shunt opening release
- Shunt closing release
- Geared motor for spring loading with electrical signaling of spring loaded
- Contact for signaling geared motor protection circuit breaker open/closed
- Contact for signaling closing spring loaded/discharged
- Transient contact with momentary closing during circuit breaker opening
- Circuit breaker auxiliary contacts
- Locking electromagnet on operating mechanism
- Position contact of withdrawable truck
- Contacts for signaling connected/isolated
- Opening solenoid
- Key lock for open position
- Isolating door interlock
- Protection for opening push-button
- Protection for closing push-button
- Locking electromagnet on withdrawable truck
- Set of six isolating contacts.

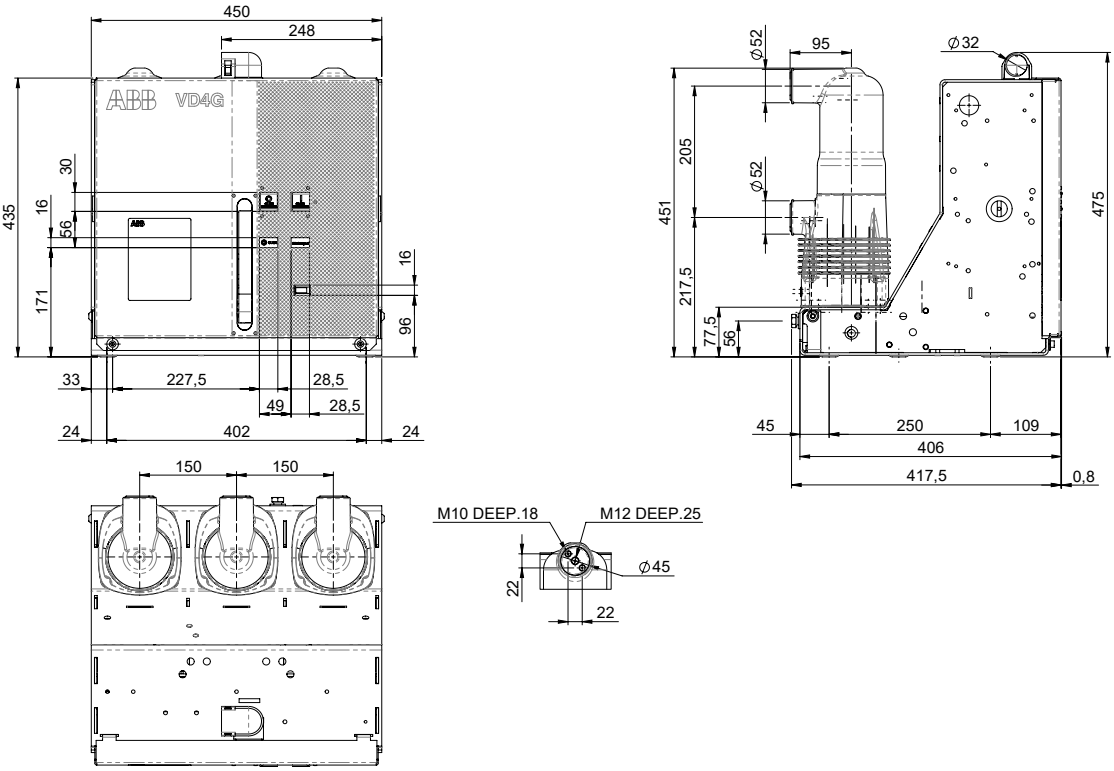
Ordering

Please contact our Service department and specify the circuit breaker serial number to order spare parts and check availability.

5. Overall dimensions

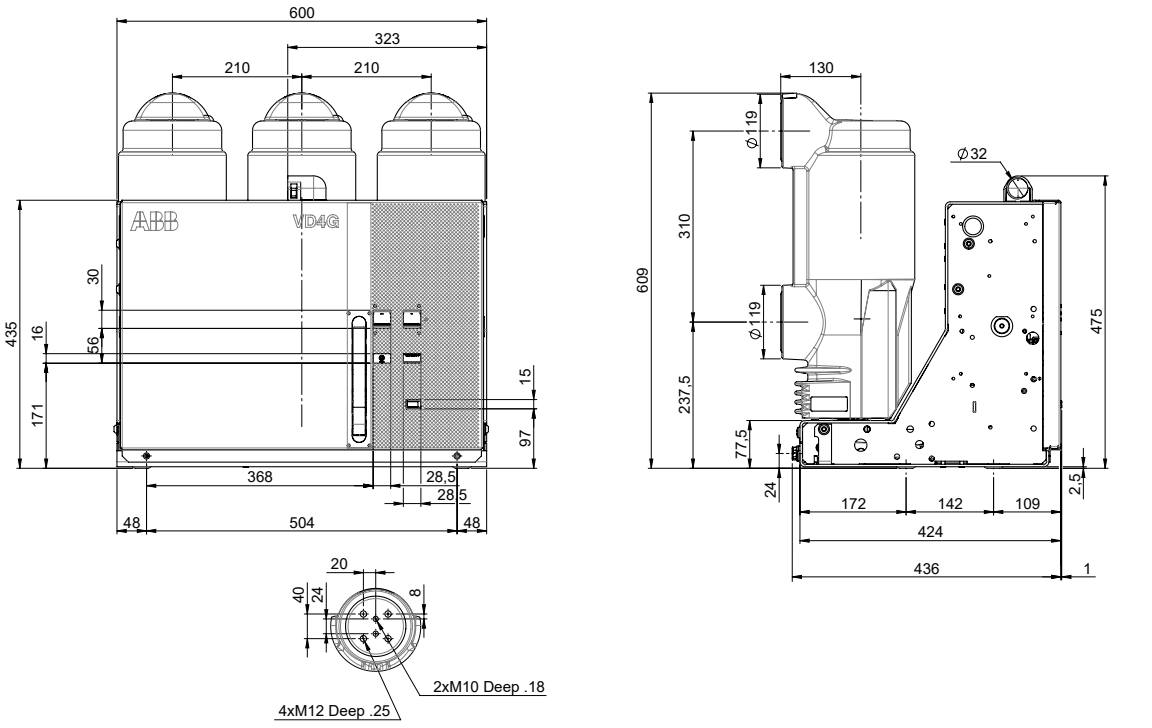
Fixed circuit breakers

VD4G		
TN	1VCD003891	
Ur	15	kV
Ir	1250	A
IscSFF	25	kA
IscGFF	16	(G2)
IscOOP	12.5	kA



Fixed circuit breakers

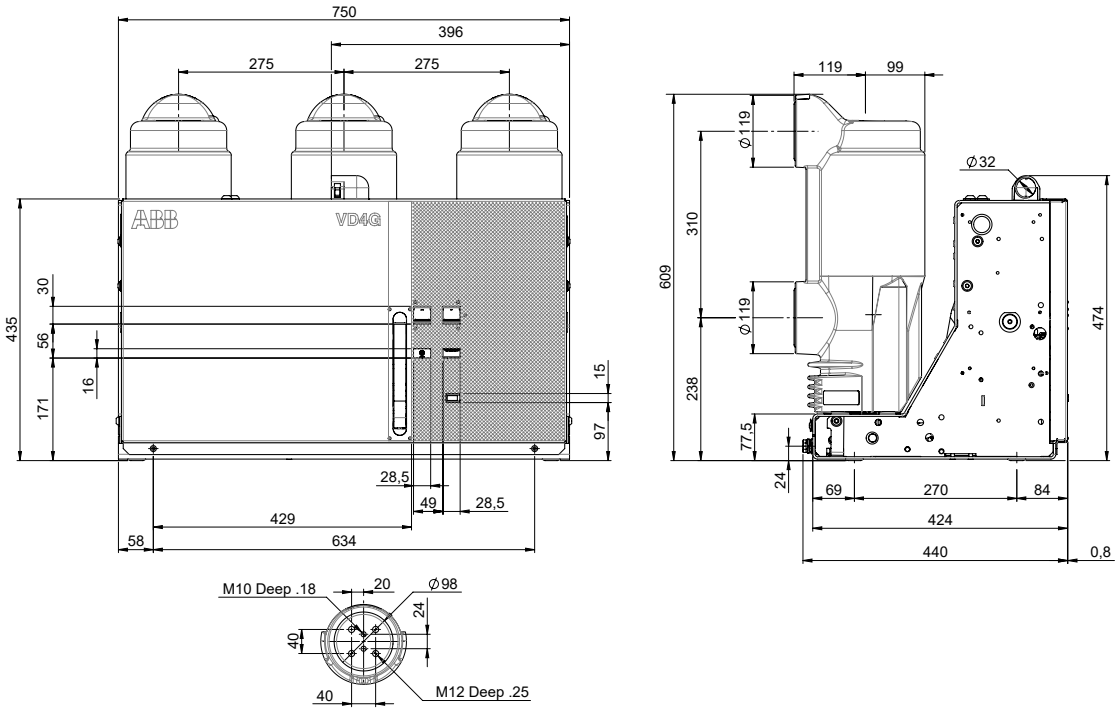
VD4G		
TN	1VCD000240	
Ur	15	kV
Ir	2000	A
IscSFF	40	kA
IscGFF	25	(G2)
IscOOP	20	kA



5. Overall dimensions

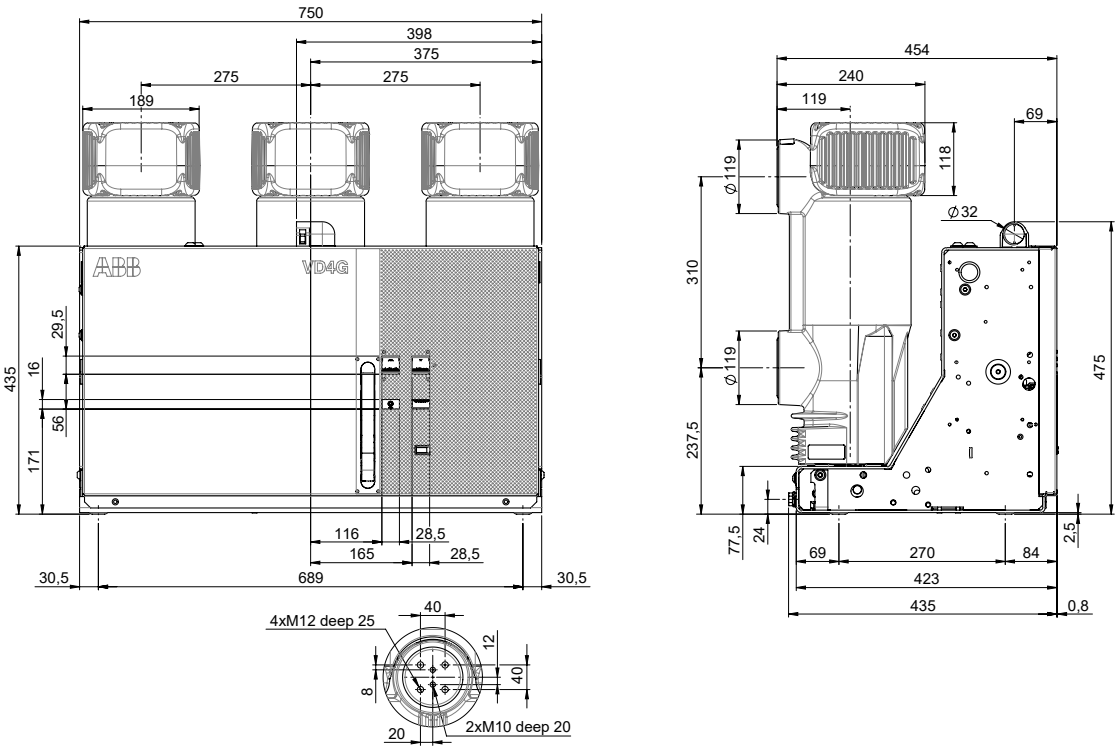
Fixed circuit breakers

VD4G		
TN	1VCD000241	
Ur	15	kV
Ir	2000	A
IscSFF	40	kA
IscGFF	25	(G2)
IscOOP	20	kA



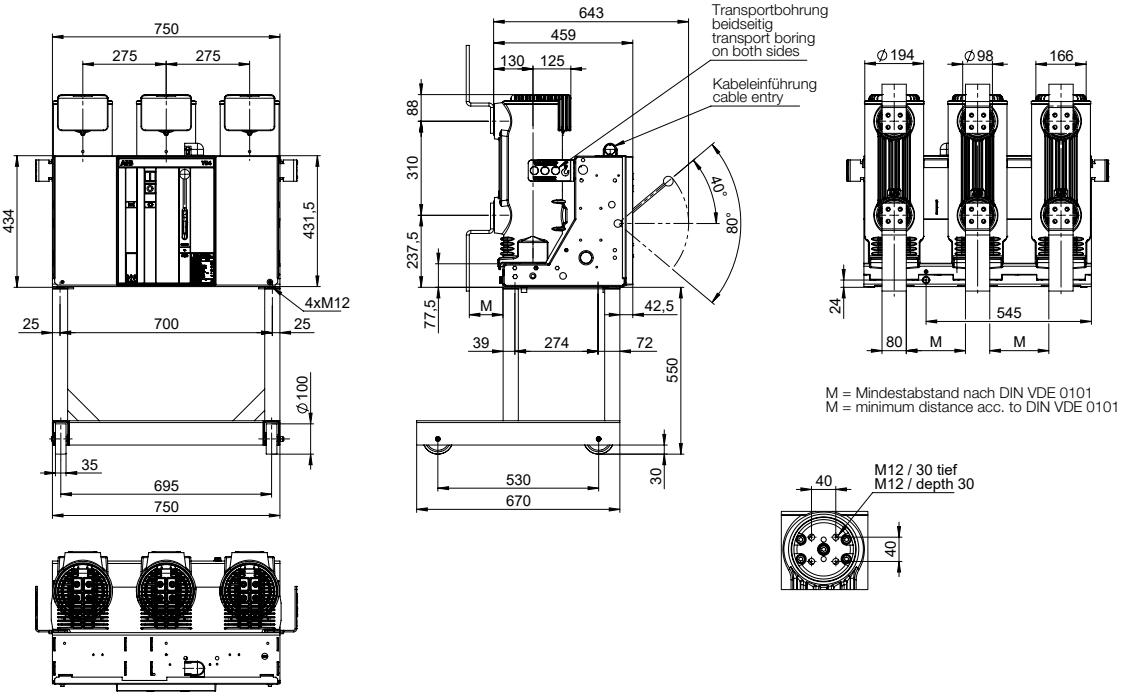
Fixed circuit breakers

VD4G		
TN	1VCD000242	
Ur	15	kV
Ir	3150	A
IscSFF	40	kA
IscGFF	25	(G2)
IscOOP	20	kA



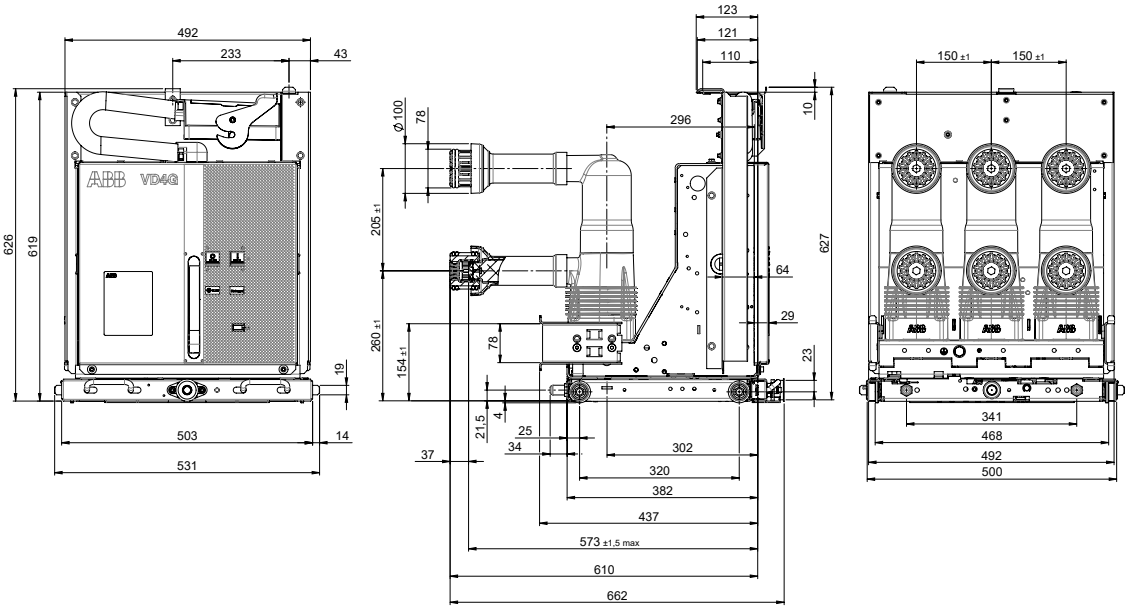
Fixed circuit breakers

VD4G		
TN	1VCD000285	
Ur	15	kV
Ir	3150	A
IscSFF	50	kA
IscGFF	50/37(G2)	
IscOOP	25	kA



Withdrawable circuit breakers

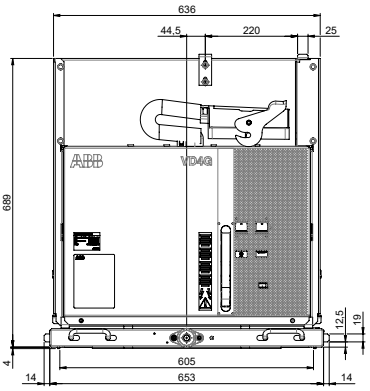
VD4G		
TN	1VCD000233	
Ur	15	kV
Ir	1250	A
IscSFF	25	kA
IscGFF	16	(G2)
IscOOP	12.5	kA

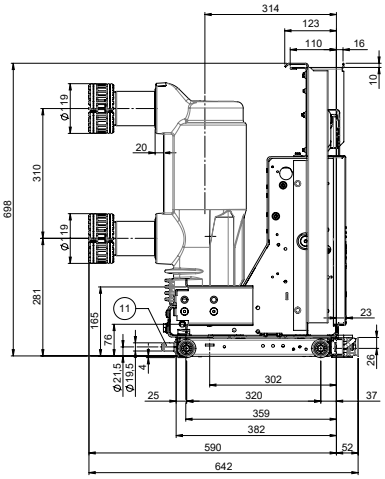


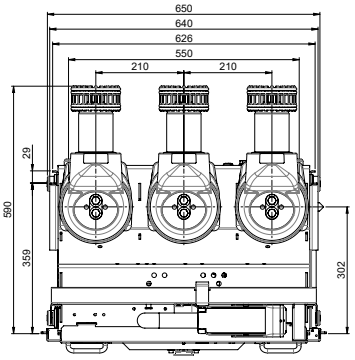
5. Overall dimensions

Withdrawable circuit breakers

VD4G		
TN	1VCD000234	
Ur	15	kV
Ir	2000	A
IscSFF	40	kA
IscGFF	25	(G2)
IscOOP	20	kA

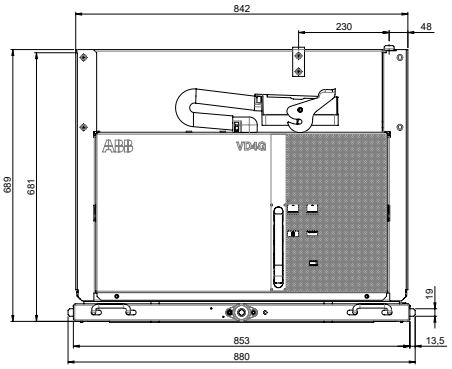


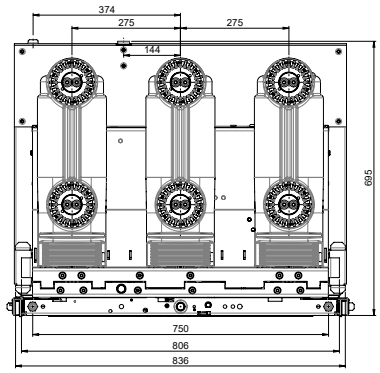


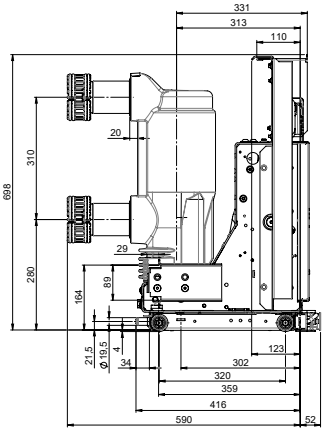


Withdrawable circuit breakers

VD4G		
TN	1VCD000243	
Ur	15	kV
Ir	2000	A
IscSFF	40	kA
IscGFF	25	(G2)
IscOOP	20	kA

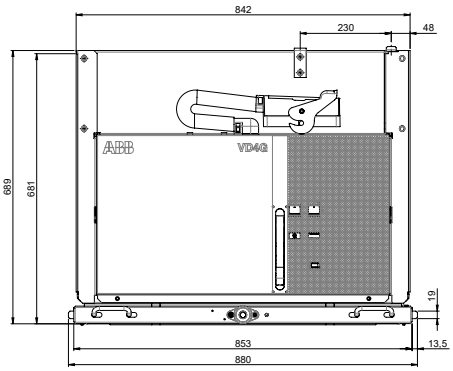


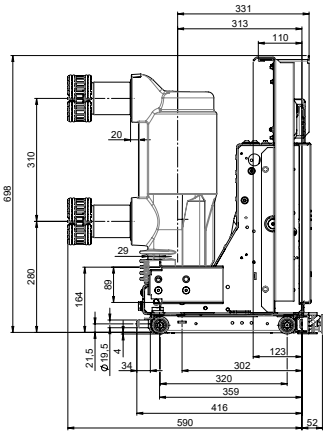


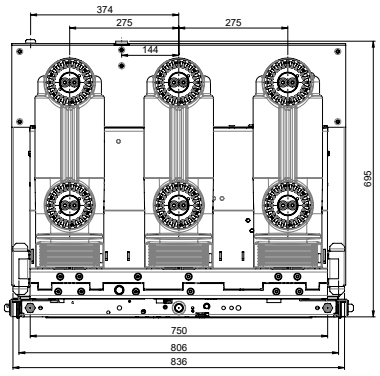


Withdrawable circuit breakers

VD4G		
TN	1VCD000243	
Ur	15	kV
Ir	2000	A
IscSFF	40	kA
IscGFF	25	(G2)
IscOOP	20	kA

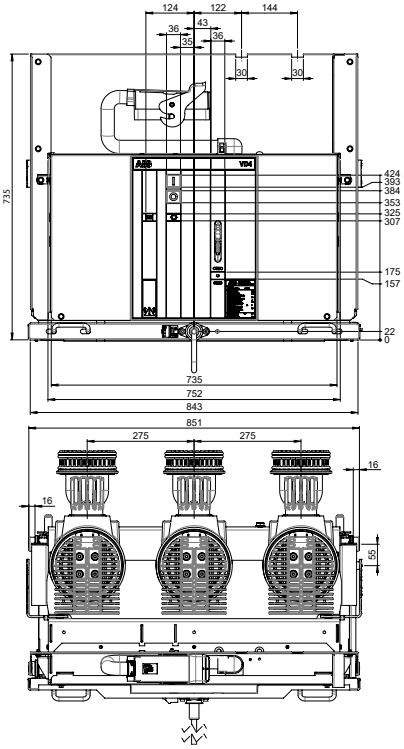


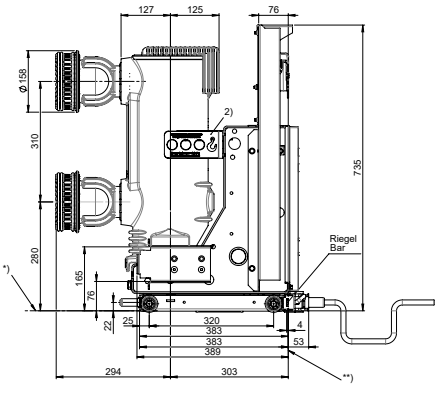




Withdrawable circuit breakers

VD4G		
TN	1VBM700160	
Ur	15	kV
Ir	3150	A
IscSFF	50	kA
IscGFF	50/37(G2)	
IscOOP	25	kA





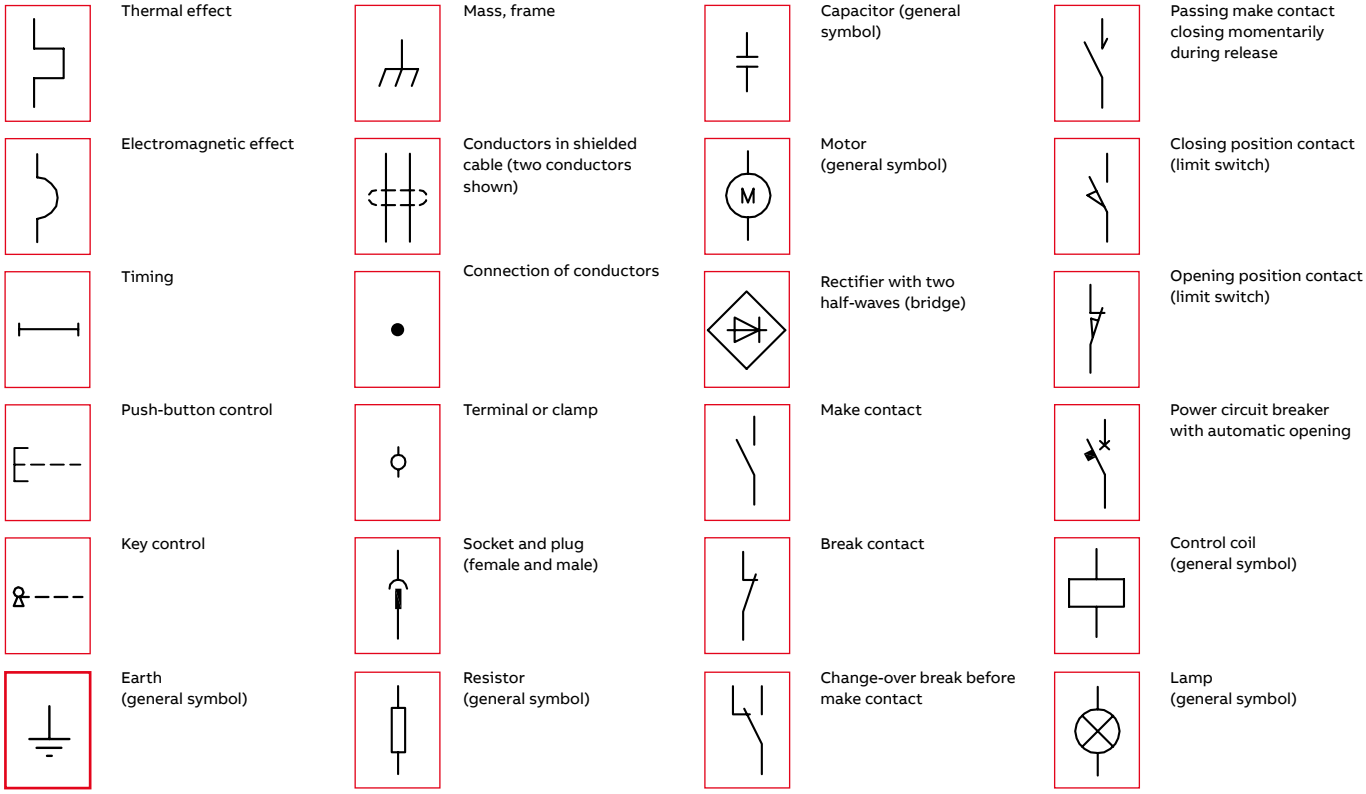
*)	Rail
**)	Front edge of bar
2)	Remove the locking lugs on both sides before commissioning

6. Electric circuit diagram

State of operation represented

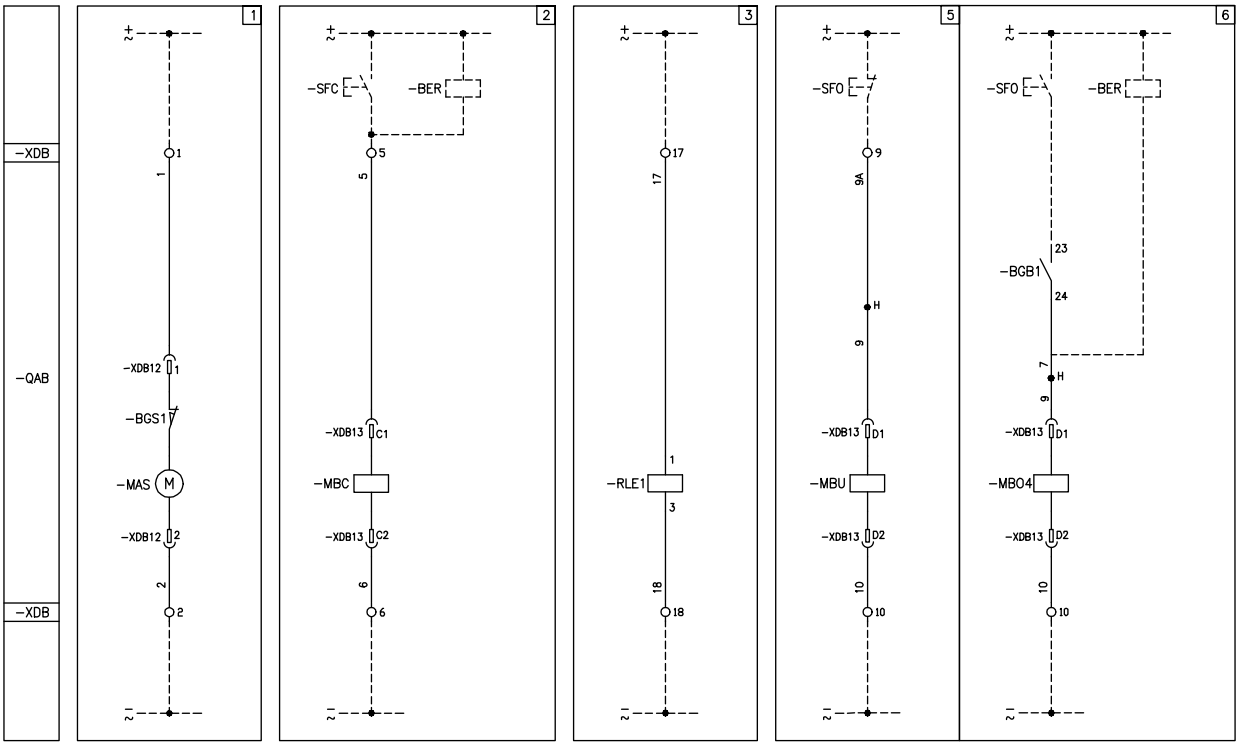
The diagrams illustrate the following conditions:
- Circuit breaker open and connected (only withdrawable circuit breaker)
- Circuits de-energized
- Closing springs discharged

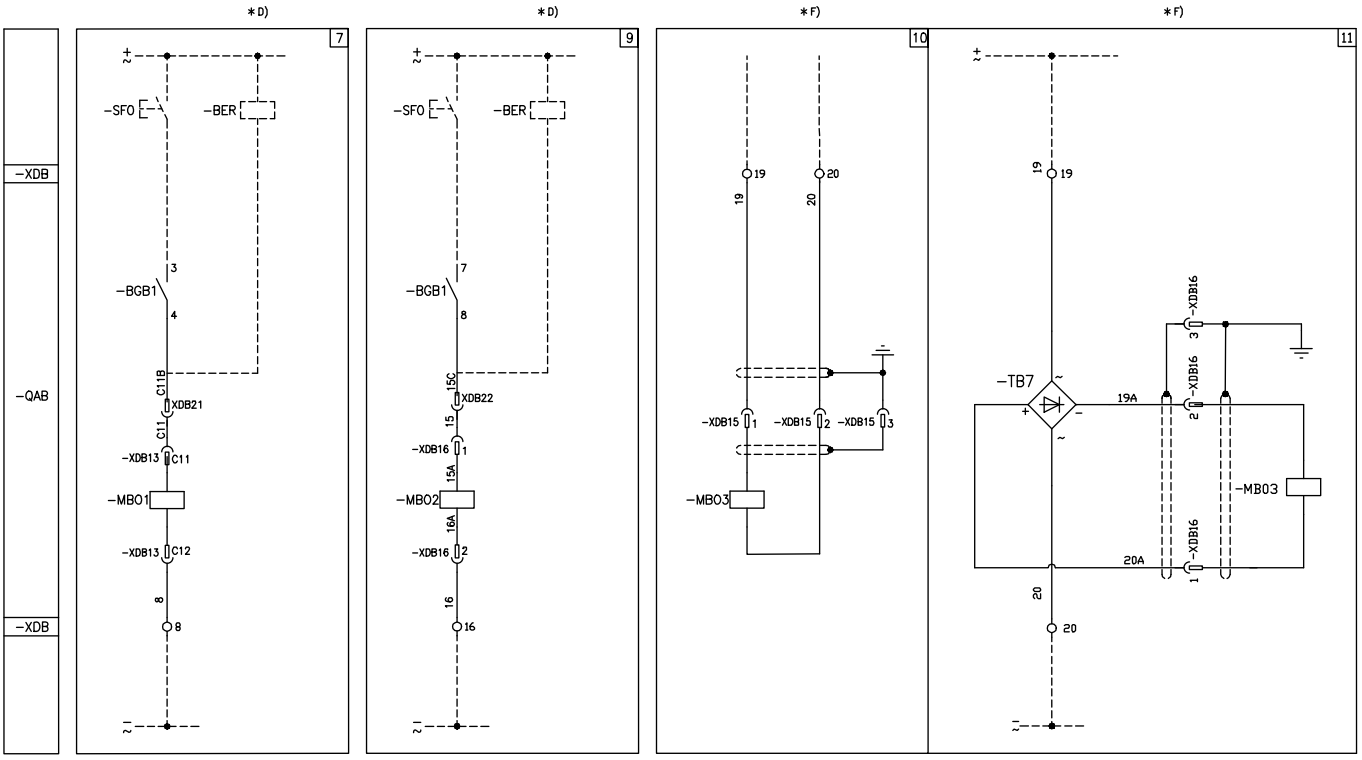
Graphical symbols for circuit diagrams



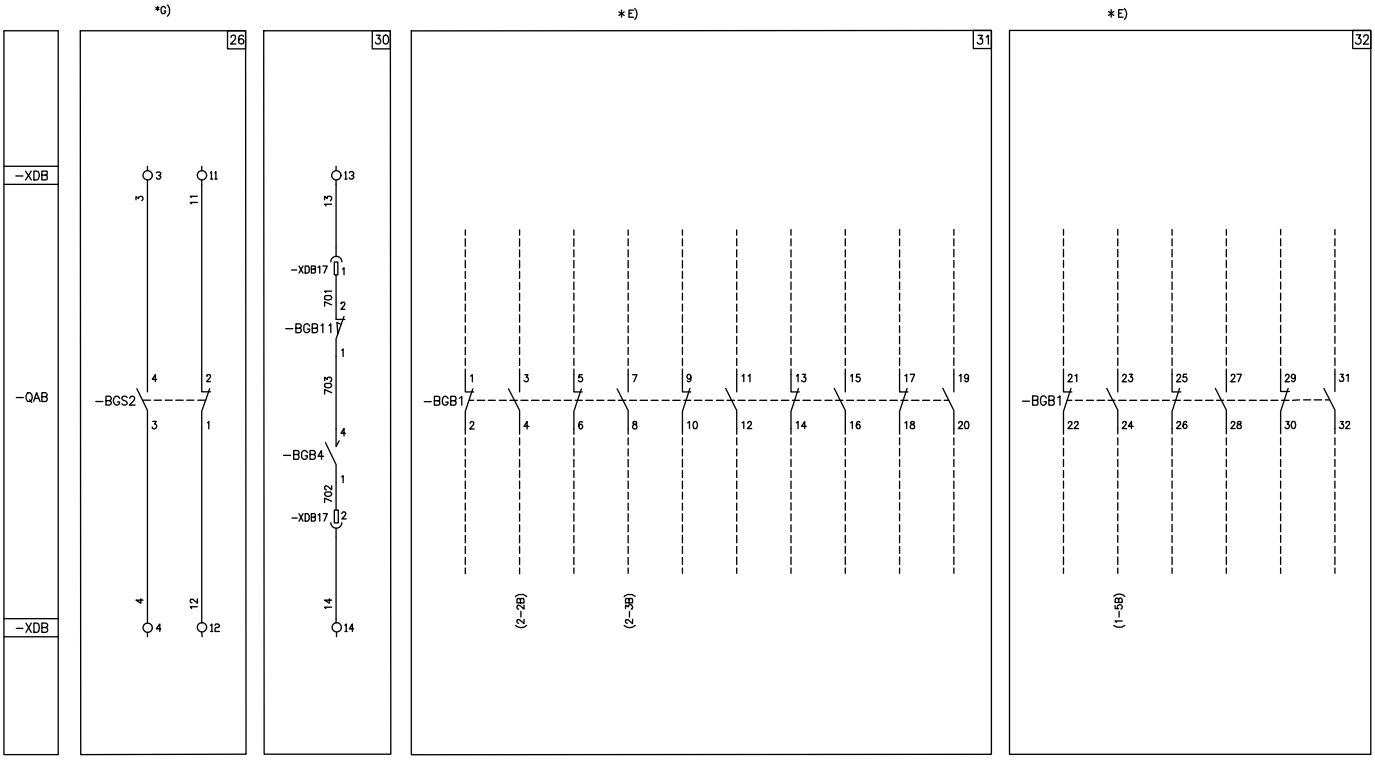
Circuit diagram of 15 kV 1VCD400151 fixed circuit breakers

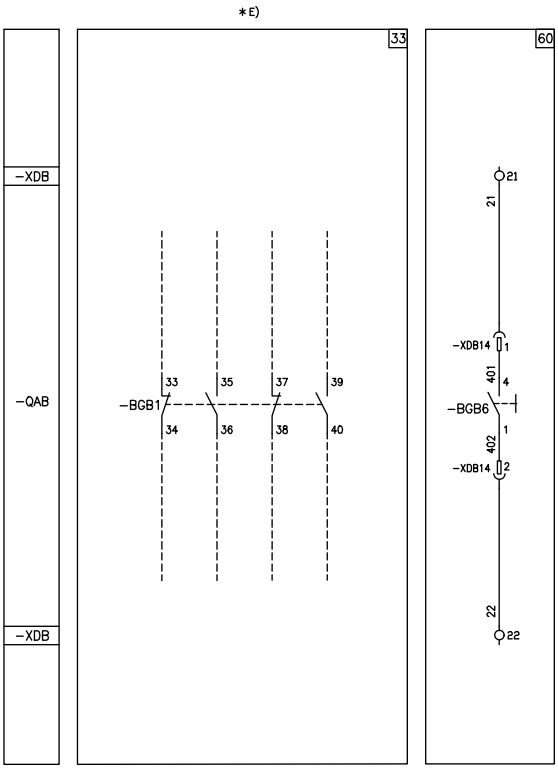
The circuit diagram shown in this section refers to 15 kV fixed circuit breakers.

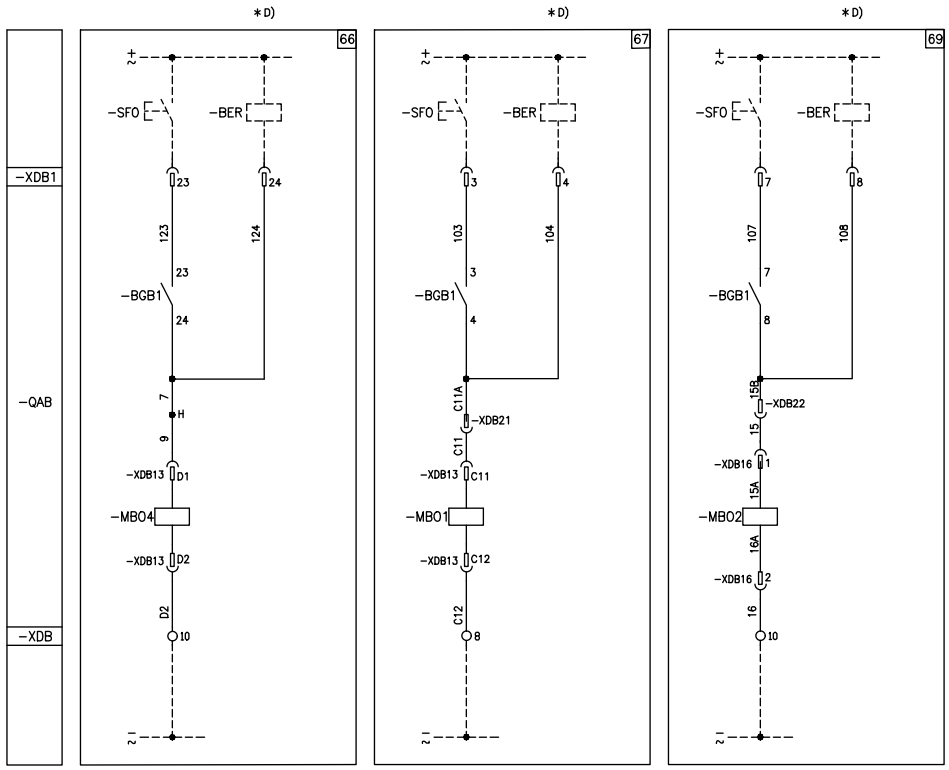


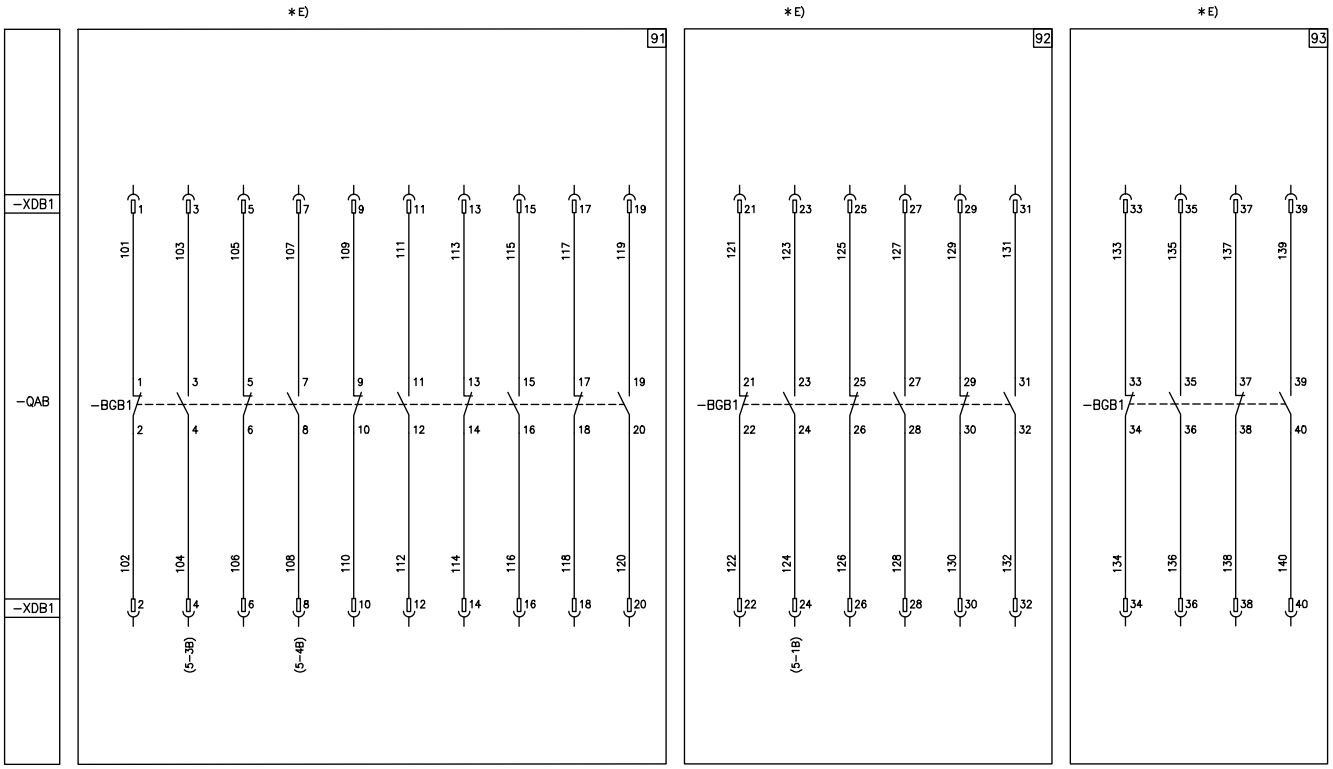


6. Electric circuit diagram






*D)
66
67
69
-XDB1
-QAB
-XDB
-SFO
-BER
-BGB1
-XDB13
-MBO4
-MBO1
-MBO2
-XDB21
-XDB22
-XDB16
D1
D2
C11
C12
H


*E)
91
92
93
-XDB1
-QAB
-BGB1
(5-3B)
(5-4B)
(5-1B)

6. Electric circuit diagram

Caption		
□	=	Figure number of the diagram.
*	=	See note indicated by the letter.
-BER	=	SOR Test Unit for monitoring continuity of shunt opening and closing release winding (see note D)
-BGB1	=	Auxiliary contacts of circuit breaker.
-BGB4	=	Auxiliary let-through contact of circuit breaker with momentary closing during circuit breaker opening.
-BGB6	=	Contact for electrical signaling of undervoltage release de-energized.
-BGB11	=	Contact for cutting off electrical signal -BGB4 if opening operation is performed in the manual mode.
-BGS1	=	Limit contact of spring loading motor.
-BGS2	=	Contact for signaling closing spring loaded-discharged.
-MAS	=	Motor for loading closing springs (see note C).
-MBC	=	Shunt closing release (see note D).
-MBO1	=	First shunt opening release (see note D).
-MBO2	=	Second shunt opening release (see note D).
-MBO3	=	Opening solenoid for release outside circuit breaker (see note F).
-MBO4	=	Third shunt opening release (see note D).
-MBU	=	Under-voltage release (see note B).
-QAB	=	Circuit breaker applications.
-RLE1	=	Locking magnet. Mechanically inhibits circuit breaker closing if de-energized.
		(Consumption can be limited by connecting a delayed operation enabling push-button in series).
-SFC	=	Push-button or contact for closing circuit breaker.
-SFO	=	Push-button or contact for opening circuit breaker.
-TB7	=	Rectifier for release -MBO3.
-XDB	=	Terminal box of circuit breaker circuits.
-XDB1	=	Connector of circuit breaker circuits.
-XDB10, ...,17	=	Connectors of applications.

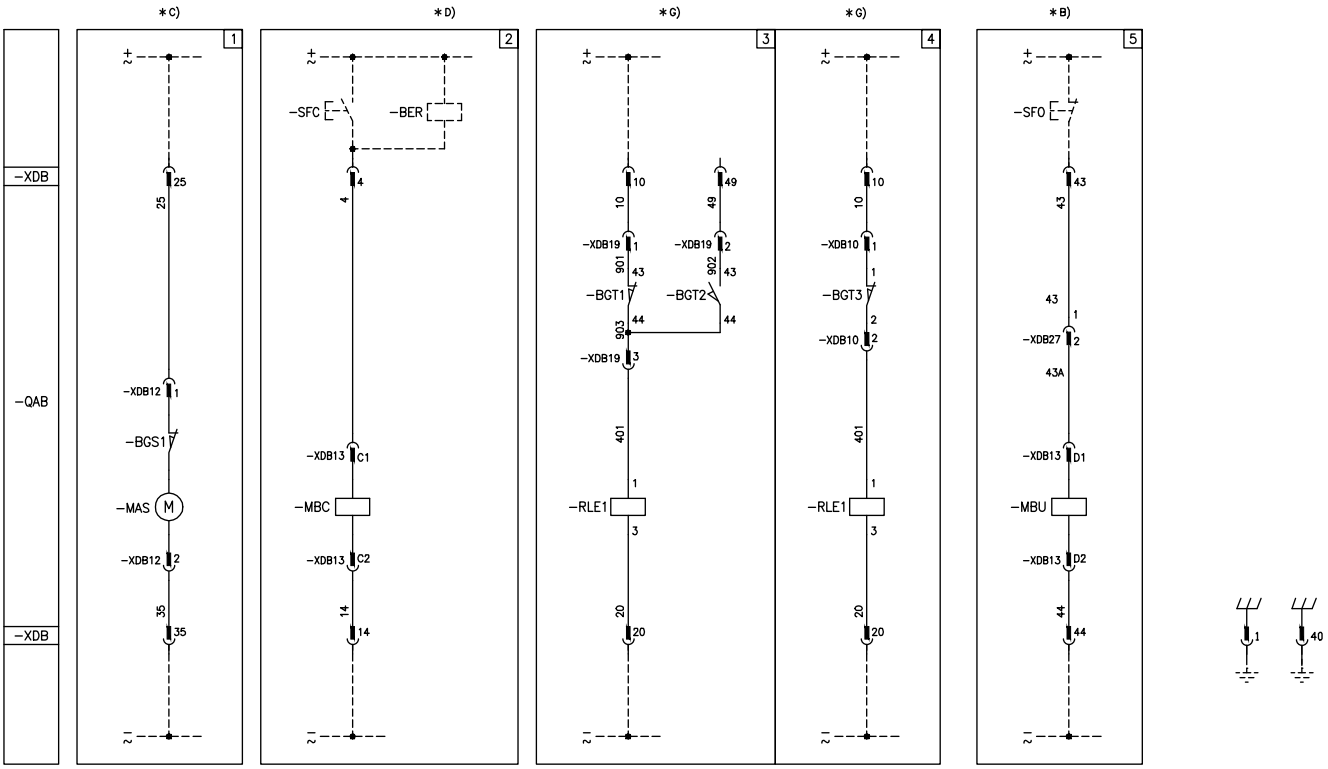
Description of the figures		
Fig. 1	=	Circuit of motor for loading closing springs (see note C).
Fig. 2	=	Shunt closing release (anti-pumping is achieved mechanically), (see note D).
Fig. 3	=	Locking magnet. Mechanically inhibits circuit breaker closing if de-energized.
		Consumption can be limited by connecting a delayed operation enabling push-button in series.
Fig. 5	=	Instantaneous undervoltage release (see note B).
Fig. 6, 66	=	Circuit of third shunt opening release with possibility of continuous control of winding (see note D).
Fig. 7, 67	=	Circuit of first shunt opening release with possibility of continuous control of winding (see note D).
Fig. 9, 69	=	Circuit of second shunt opening release with possibility of continuous control of winding (see note D).
Fig. 10	=	Opening solenoid for release outside circuit breaker.
Fig. 11	=	Opening solenoid for release outside circuit breaker with AC supply.
Fig. 26	=	Electrical signaling of closing springs loaded and discharged.
Fig. 30	=	Auxiliary let-through contact of circuit breaker with momentary closing during circuit breaker opening.
Fig. 31, 91	=	Available auxiliary contacts of circuit breaker (see note E).
Fig. 32, 92	=	Available auxiliary contacts of circuit breaker (see note E).
Fig. 33, 93	=	Available auxiliary contacts of circuit breaker (see note E).
Fig. 60	=	Contact for electrical signaling of undervoltage release de-energized.

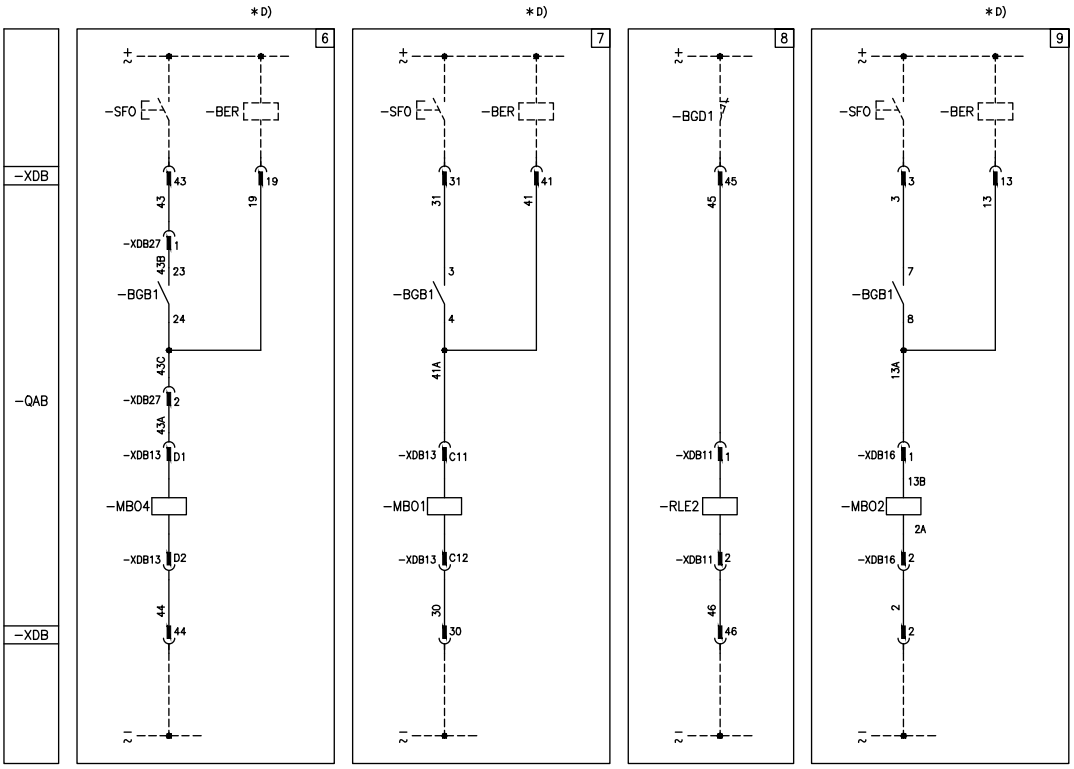
Incompatibility
The circuits indicated in the following figures cannot be supplied at the same time in the same circuit breaker:
5-6-66 | 7-67 | 9-69 | 31-91 | 32-92 | 33-93 | 10-11

Notes	
A)	The circuit breaker is equipped solely with the applications specified in the order confirmation. Consult this catalog for information about how to make out an order.
B)	The undervoltage release can be supplied for energizing with voltage derived from the supply side of the circuit breaker or from an independent source. Circuit breaker closing is only enabled when the release is energized (closing lock is obtained mechanically). If there is the same power supply for the shunt closing and under-voltage releases and the circuit breaker must close automatically when auxiliary voltage returns, there must be a 50 ms delay between the under-voltage release's enabling instant and energizing of the shunt closing release. Incompatible with -MBO4.
C)	Check power of auxiliary circuit to find out whether several motors for loading the closing springs can be operated at the same time. To prevent excessive power draw, the springs must be loaded by hand before the auxiliary circuit is powered.
D)	The circuit for monitoring the continuity of the release windings must only be used for that purpose. The SOR Test Unit can be used for checking the continuity of the various different releases. -MBO4 incompatible with -MBU. -MBO4 not available for VD4 50 kA.
E)	When fig. 6 is required, contact -BGB1 (23-24) of fig.32 is not available. When fig. 7 is required, contact -BGB1 (3-4) of fig. 31 is not available. When fig. 9 is required, contact -BGB1 (7-8) of fig. 31 is not available. When fig. 32 is required, it is obligatory to supply the auxiliary contacts of fig. 31. When fig. 33 is required, it is obligatory to supply the auxiliary contacts of fig. 32. When fig. 66 is required, contact -BGB1 (23-24) of fig. 92 is not available. When fig. 67 is required, contact -BGB1 (3-4) of fig. 91 is not available. When fig. 69 is required, contact -BGB1 (7-8) of fig. 91 is not available. When fig. 92 is required, it is obligatory to supply the auxiliary contacts of fig. 91. When fig. 93 is required, it is obligatory to supply the auxiliary contacts of fig. 92. Figs. 33 and 93 are not available for VD4 50 kA.
F)	Figs. 10 and 11 are only available for VD4 up to 31.5 kA.
G)	The energizing voltage must be the same for both signals.

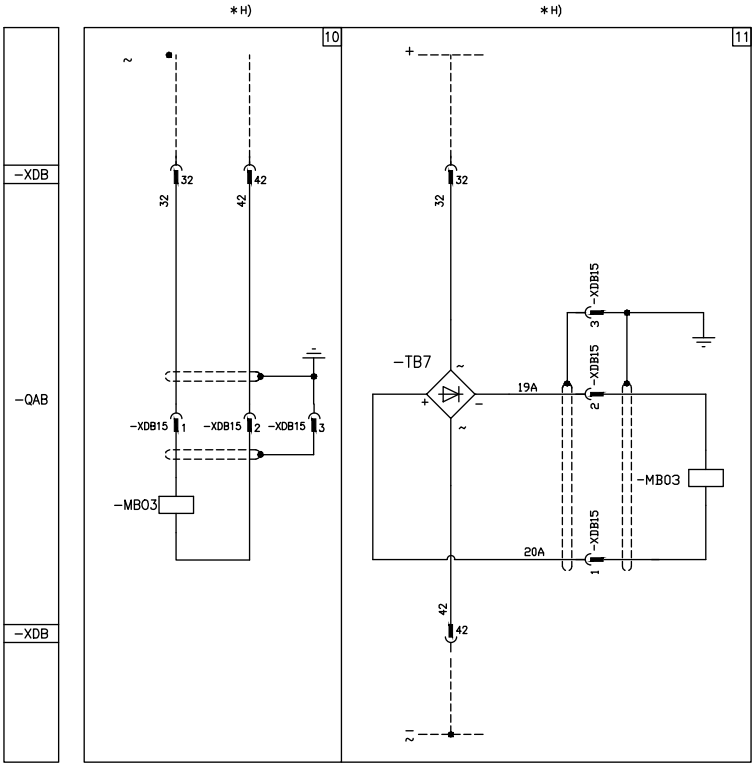
6. Electric circuit diagram

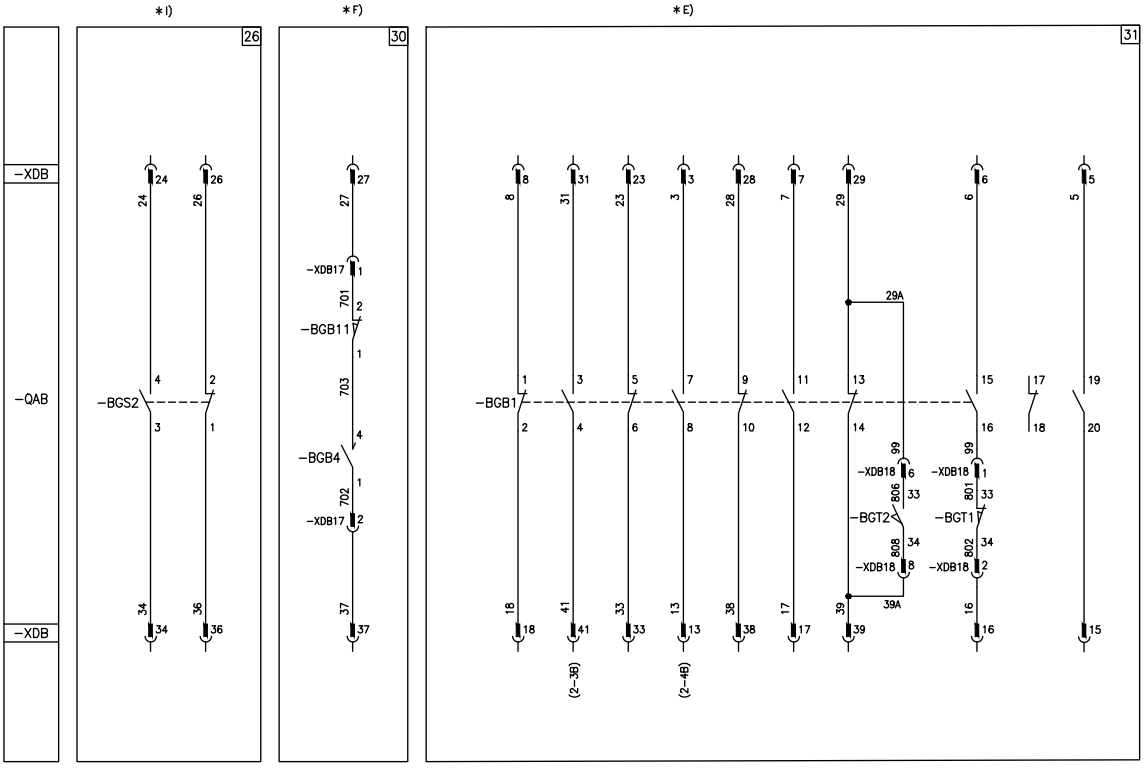
Circuit diagram of withdrawable circuit breakers for UniGear switchgear 15 kV 1VCD 400155



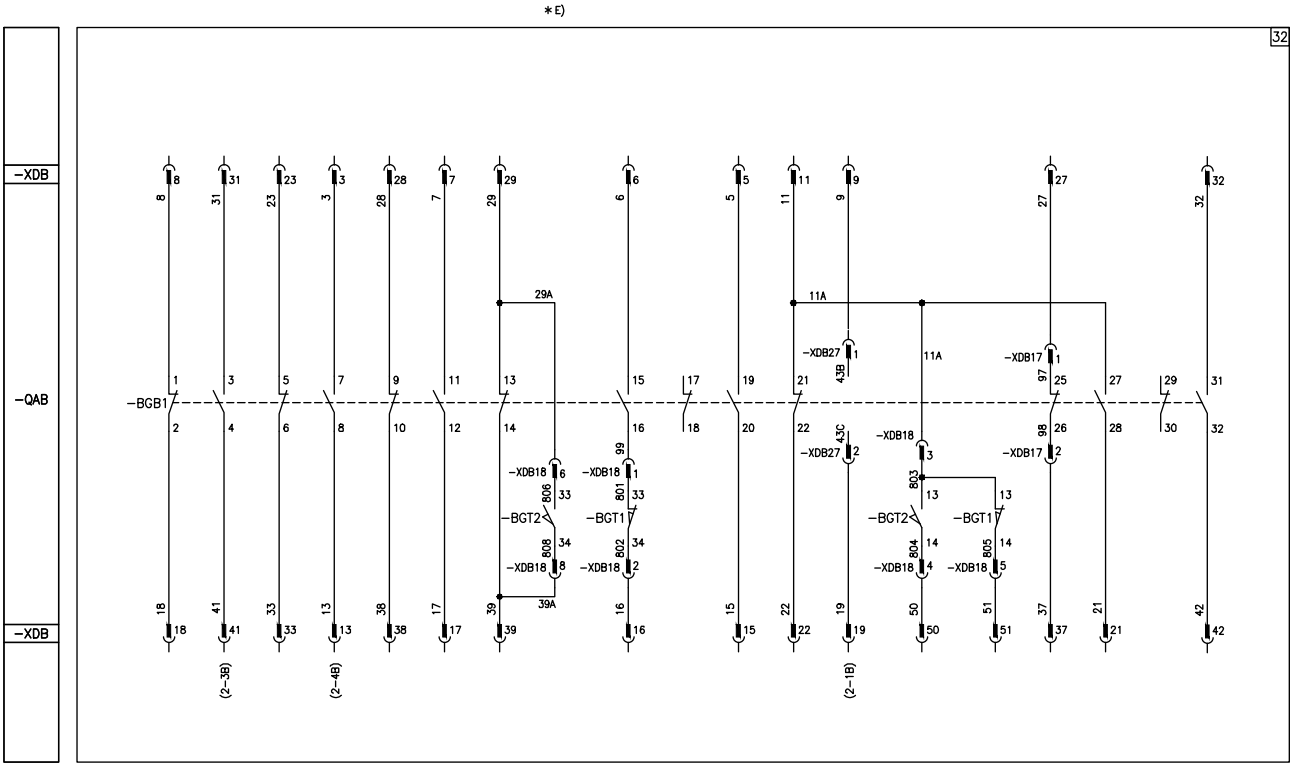


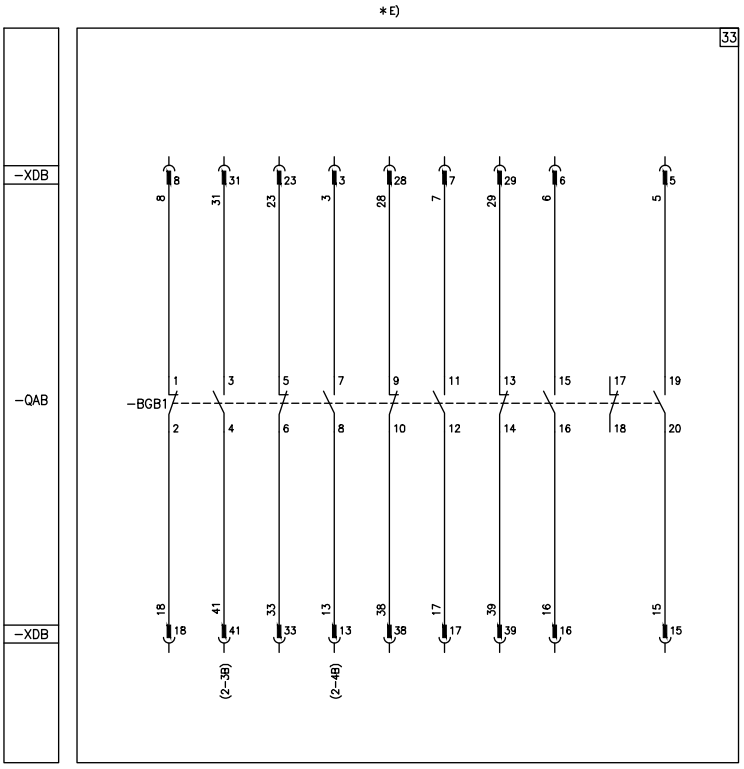
The circuit diagram given in this section refers to withdrawable circuit breakers for UniGear switchgear. See diagram 1VCD400156 for withdrawable circuit breakers with motor-operated truck.

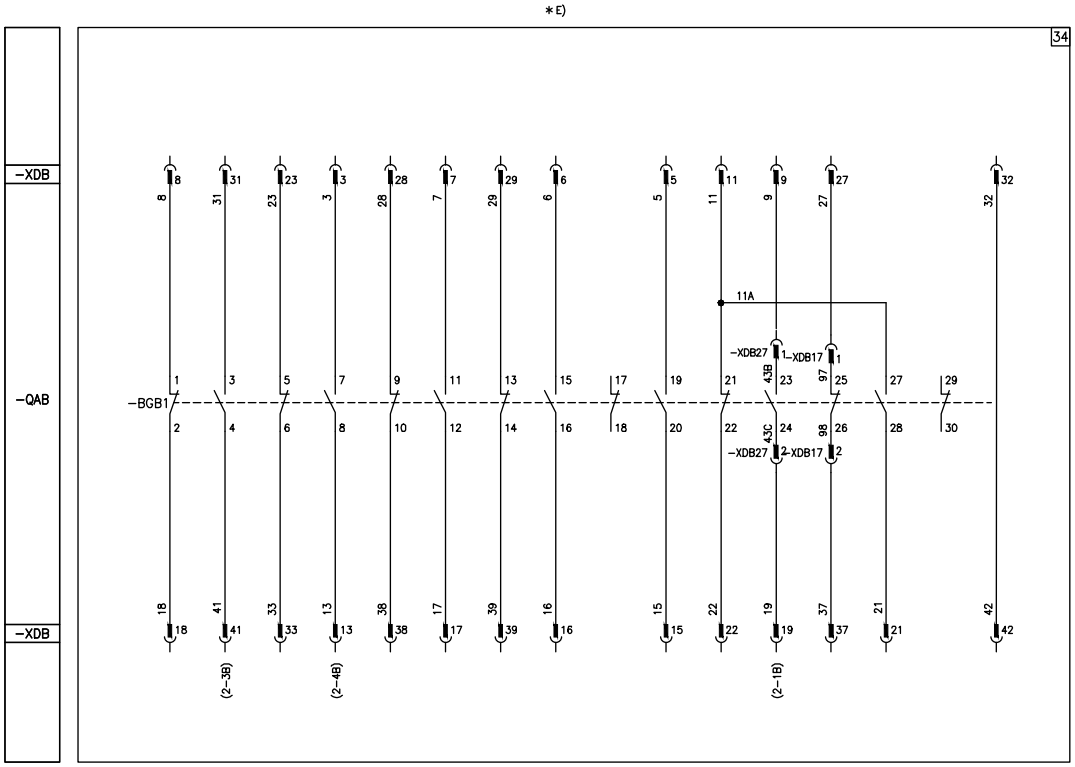


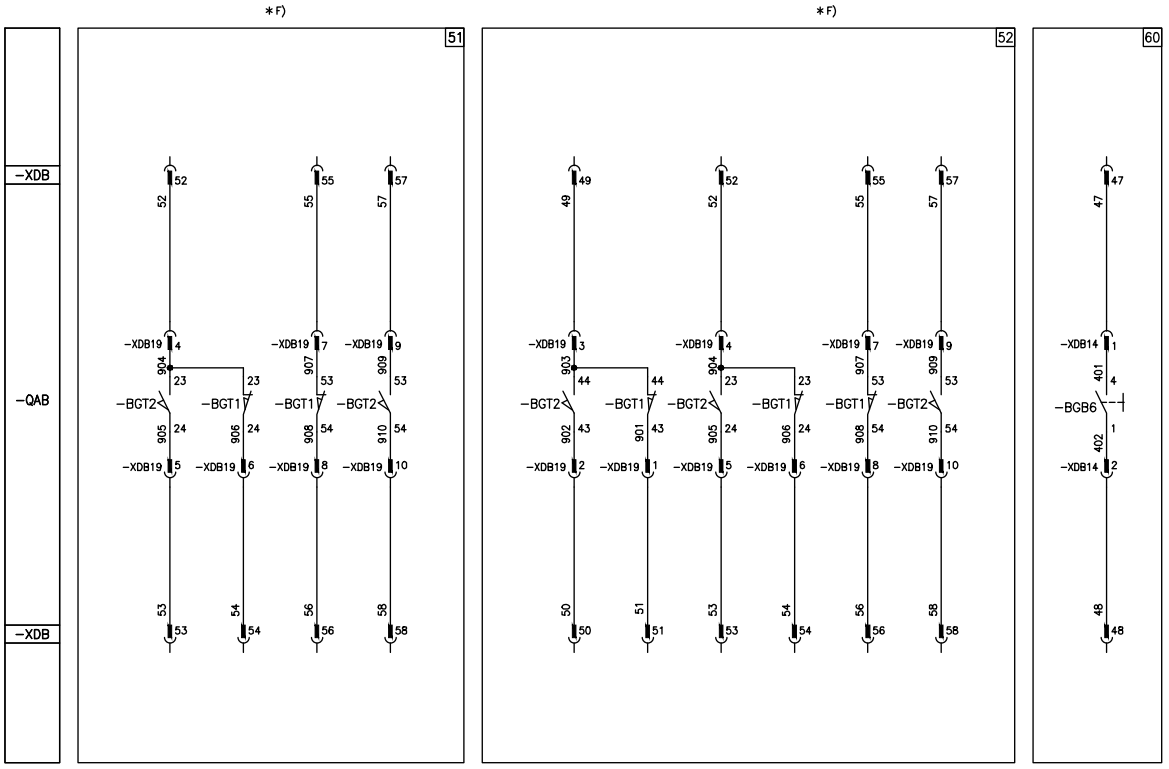


6. Electric circuit diagram






*E)
34
-XDB
-QAB
-XDB
-BGB1
11A
-XDB27
-XDB17
43B
43C
97
98
(2-3B)
(2-4B)
(2-1B)


*F)
*F)
51
52
60
-XDB
-QAB
-XDB
-XDB19
-BGT2
-BGT1
-XDB14
-BGB6

6. Electric circuit diagram

Caption		
□	=	Figure number of the diagram.
*	=	See note indicated by the letter.
-BER	=	SOR Test Unit for monitoring continuity of shunt opening and closing release winding (see note D)
-BGB1	=	Auxiliary contacts of circuit breaker.
-BGB4	=	Auxiliary let-through contact of circuit breaker with momentary closing during circuit breaker opening.
-BGB6	=	Contact for electrical signaling of undervoltage release de-energized.
-BGB11	=	Contact for cutting off electrical signal -BGB4 if opening operation is performed in the manual mode.
-BGD1	=	Enclosure door position contact.
-BGS1	=	Limit contact of spring loading motor.
-BGS2	=	Contact for signaling closing springs loaded-discharged.
-BGT1	=	Electrical signaling contacts for circuit breaker in racked-in position (see note F)
-BGT2	=	Electrical signaling contacts for circuit breaker in isolated position (see note F)
-BGT3	=	Circuit breaker position contact, open during isolating travel.
-MAS	=	Motor for loading closing springs (see note C).
-MBC	=	Shunt closing release (see note D).
-MBO1	=	First shunt opening release (see note D).
-MBO2	=	Second shunt opening release (see note D).
-MBO3	=	Opening solenoid for release outside circuit breaker.
-MBO4	=	Third shunt opening release (see note D).
-MBU	=	Under-voltage release (see note B).
-QAB	=	Circuit breaker applications.
-RLE1	=	Locking magnet. Mechanically inhibits circuit breaker closing if de-energized. (Consumption can be limited by connecting a delayed push-button in series so as to enable the operation).
-RLE2	=	Locking magnet (on truck). Mechanically inhibits circuit breaker racking-in and isolating if de-energized. (Consumption can be limited by connecting a delayed push-button in series so as to enable the operation).
-SFC	=	Push-button or contact for closin circuit breaker
-SFO	=	Push-button or contact for closing circuit breaker.
-TB7	=	Rectifier for release -MBO3.
-XDB	=	Terminal box of circuit breaker circuits.
-XDB10, ... , 27	=	Connectors of applications
-XDB28	=	Connector of applications.

Description of the figures		
Fig. 1	=	Circuit of motor for loading closing springs (see note C).
Fig. 2	=	Shunt closing release (anti-pumping is achieved mechanically). (see note D).
Fig. 3	=	Locking magnet. Mechanically inhibits circuit breaker closing if de-energized. (If -RL1 is required, provide this figure when fig.31 or 32 are selected). Consumption can be limited by connecting a delayed push-button in series so as to enable the operation.
Fig. 4	=	Locking magnet. Mechanically inhibits circuit breaker closing if de-energized. (If -RL1 is required, provide this figure when fig.33 or 34 are selected). Consumption can be limited by connecting a delayed push-button in series so as to enable the operation.
Fig. 5	=	Instantaneous undervoltage release (see note B).
Fig. 6	=	Circuit of third opening release with continuous control of winding (see note D).
Fig. 7	=	Circuit of first opening release with continuous control of winding (see note D).
Fig. 8	=	Locking magnet (on truck). Mechanically inhibits circuit breaker racking-in and isolating if de-energized. (Consumption can be limited by connecting a delayed push-button in series so as to enable the operation).
Fig. 9	=	Circuit of second opening release with continuous control of winding (see note D).
Fig. 10	=	Opening solenoid for release outside circuit breaker.
Fig. 11	=	Opening solenoid for release outside circuit breaker with AC supply.
Fig. 26	=	Electrical signaling of closing springs loaded and discharged.
Fig. 30	=	Auxiliary let-through contact of circuit breaker with momentary closing during circuit breaker opening.
Fig. 31, ... , 34	=	Available auxiliary contacts of circuit breaker (see note E).
Fig. 51	=	Contacts for electrical signaling of circuit breaker in racked-in and isolated positions located on circuit breaker truck (obligatory when fig. 31 or 32 are required).
Fig. 52	=	Contacts for electrical signaling of circuit breaker in racked-in and isolated positions located on circuit breaker truck (supplied on request when fig. 33 or 34 are required).
Fig. 60	=	Contact for electrical signaling of undervoltage release de-energized.

Incompatibility
The circuits indicated in the following figures cannot be supplied at the same time in the same circuit breaker:
3-4 | 3-33-34 | 4-31-32 | 5-6 | 10-11 | 31-32-33-34 | 31-32-52 | 33-34-51 | 51-52

Notes	
A)	Circuit breaker is equipped solely with the applications specified in the order confirmation. Consult this catalog for information about how to make out an order.
B)	The undervoltage release can be supplied for energizing with voltage derived from the supply side of the circuit breaker or from an independent source. Circuit breaker closing is only enabled when the release is energized (closing lock is obtained mechanically). If there is the same power supply for the shunt closing and under-voltage releases and the circuit breaker must close automatically when auxiliary voltage returns, there must be a 50 ms delay between the under-voltage release's enabling instant and energizing of the shunt closing release. Incompatible with -MBO4.
C)	Check power of auxiliary circuit to find out whether several motors for loading the closing springs can be operated at the same time. To prevent excessive power draw, the springs must be loaded by hand before auxiliary circuit is powered.
D)	The circuit for monitoring the continuity of the release windings must only be used for that purpose. The SOR Test Unit can be used for checking the continuity of the various different releases: -MBO4 incompatible with -MBU. -MBO4 not available on Vmax and VD4 50kA.
E)	When fig. 6 is required, contact -BGB1 (23-24) of fig. 32-34 is not available. When fig. 7 is required, contact -BGB1 (3-4) of fig. 31-32-33-34 is not available. When fig. 9 is required, contact -BGB1 (7-8) of fig. 31-32-33-34 is not available. When fig. 10 or 11 are required, contact -BGB1 (31-32) of fig. 32 and 34 is not available. When fig. 30 is required, contact -BGB1 (25-26) of fig. 32 and 34 is not available.
F)	The contacts for electrical signaling of circuit breaker in isolated and racked-in position (-BGT1 and BGT2) shown in fig. 51-52 are installed on circuit breaker truck (movable part).
G)	Fig. 3 is supplied when fig. 31 or 32 are required. Fig. 4 is supplied when fig. 33 or 34 are required (in this case, it is obligatory to supply –BGT3).
H)	Fig. 10 is only available for VD4 up to 31.5 kA and Vmax. Fig. 11 is only available for VD4 up to 31.5 kA.
I)	The energizing voltage must be the same for both signals.

Notes

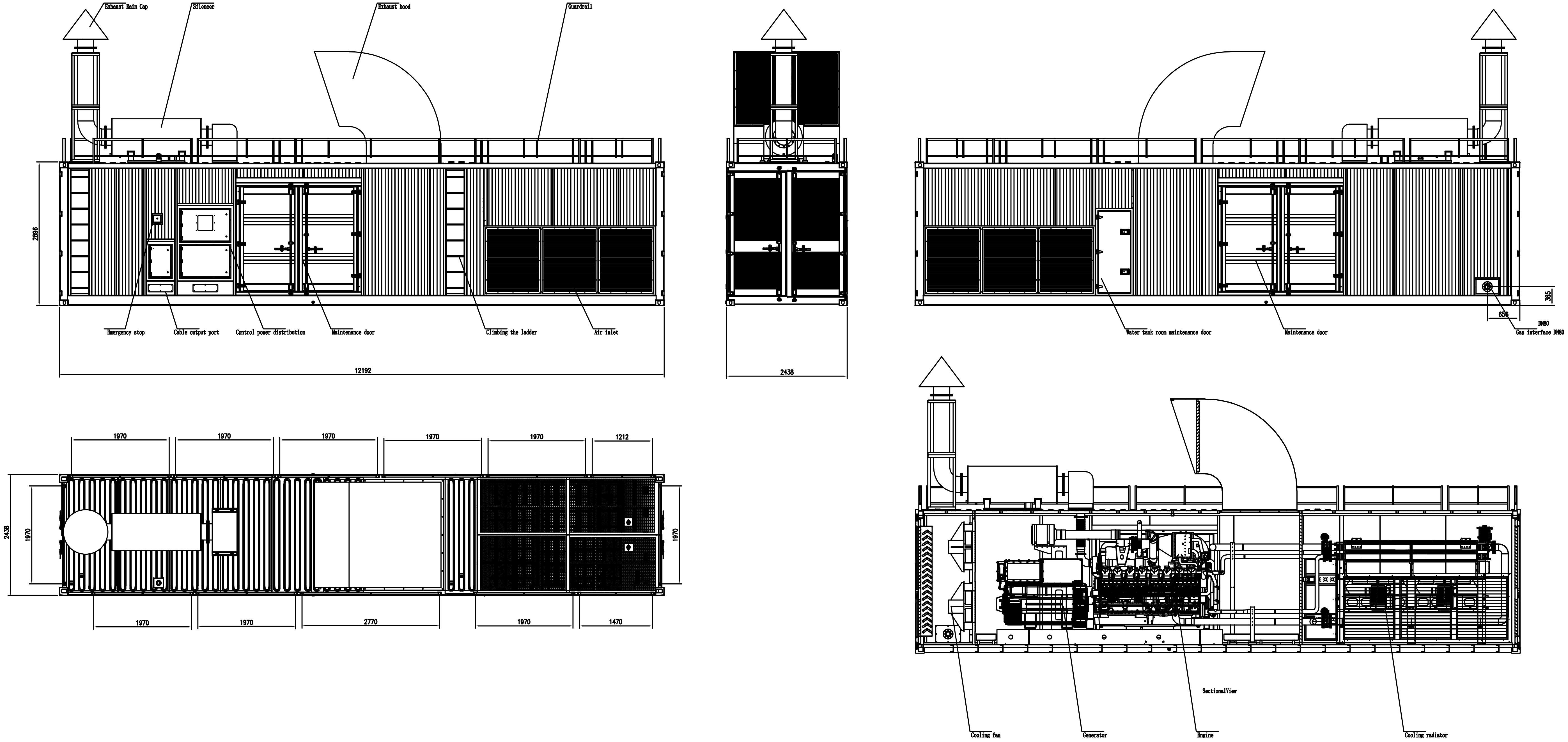
For more information please contact:

More product information:
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More service information:
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1VCP000671 - Rev. A, en - Technical catalog - 2018.01 (VD4G) (gs)



Plan diagram, for reference only

1000kW

Gas Genset

S

1

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