MEDIUM VOLTAGE SERVICE

VM1/A/LR

Addendum to VM1/A/P installation and service instructions for service application

Index:

For your safety!

- Make sure that the installation room (space and environment) is suitable for the electrical apparatus.
- Check that all the installation, putting into service and maintenance operations are carried out by qualified personnel with suitable knowledge of the apparatus.
- Make sure that the standard and legal prescriptions are complied with during installation, putting into service and maintenance, so that installations are performed according to the rules of good working practice and safety in the work place.
- Strictly follow the information in this instruction manual.
- Check that the rated performance of the apparatus is not exceeded during service.
- Check that the personnel operating the apparatus have this instruction manual at hand as well as the necessary information for correct use.
- Pay special attention to the danger notes indicated in the manual by the following safety notifications:

CAUTION

Responsible behaviour safeguards your own and others' safety!
For any requests, please contact the ABB Medium Voltage Service.

Safety notations alert personnel to possible death, injury or property damage situations. The safety notations appear before the step in which the condition applies.
The one safety notice and three hazard levels notations are:

WARNING

Indicates a hazardous situation that has some probability of severe injury and substantial property damage.

DANGER

Indicates a hazardous situation that has a high probability of death, severe injury, and substantial property damage.

CAUTION

Indicates a hazardous situation that may result in minor or moderate injury and/or property damage.

NOTICE

Indicates a statement of company policy as it relates to the safety of personnel or protection of property.

2. Applicability and characteristics VM1/A/LR

Instructions for VM1/A/LR:
VM1/A/LR circuit breakers are based on the version of VM1/A/P. So much so, most of the information in the VM1/A/P instruction manual is also applicable to this circuit breaker.
Please refer to the instruction manual of the VM1/A/P circuit breaker (code 1VCD601003) for specific information.
Additional information concerning the VM1/A/LR circuit breaker is given in this supplement.

NOTICE

Ask to ABB in the case of a circuit breaker with motorized isolation in OneFit retrofill for a remote control solutions.

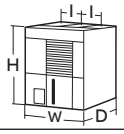
3. Manual emergency opening for OneFit applications

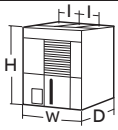
Perform emergency operation with installation disconnected from supply source and OneFit dead front cover-door open.
If circuit breaker is racked-in, comply with instructions code 1VCD601469 so as to bypass interlocks and remove door.

⚠ CAUTION

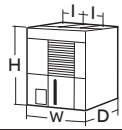
All the installation, putting into service, Running and maintenance operations Must be carried out by skilled personnel With in-depth knowledge of the Apparatus.

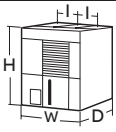
4. General characteristics of withdrawable circuit breakers

Circuit breaker		**VM1/A/LR**	**VM1/A/LR**
OneFit		**W600**	**W600**
Standards	C37.04	•	•
Rated voltage	Ur [kV]	05-15	05-15
Rated insulation voltage	Us [kV]	05-15	05-15
Withstand voltage at 50 Hz	Ud (1 min) [kV]	19-36	19-36
Impulse withstand voltage	Up [kV]	60-95	60-95
Rated frequency	fr [Hz]	50-60	50-60
Rated normal current (40 °C)	(1) Ir [A]	1200	2000
Rated breaking capacity (rated symmetrical short-circuit current - 5 cycles)	Isc [kA]	40	31.5
Rated-short time withstand current (3 s)	Ik [kA]	40	31.5
Making capacity	Ip [kA]	104	82
Operation sequence	[O-0.3s-CO-3min-CO]	•	•
Opening time	[ms]	40 ... 70	40 ... 70
Arc duration	[ms]	8 ... 13	8 ... 13
Total interruption time	[ms]	45 ... 60 < 83	45 ... 60 < 83
Closing time	[ms]	45 ... 80	45 ... 80
Mechanical operations (cycles)	Actuator [No]	... 50,000	... 100,000
	Interrupters [No]	... 30,000	... 30,000
Electrical operations (cycles)	Rated current [No]	... 30,000	... 30,000
	Under short circuit [No]	... 100	... 100
Maximum overall Dimensions 	H [mm/inch]	692/27.2	692/27.2
	W [mm/inch]	503/19.8	503/19.8
	D [mm/inch]	662/26	662/26
	Pole centre distance I [mm/inch]	150/5.9	150/5.9
Weight	[kg/lb]	172/379	197/434
Standardized table of dimensions		1VCS009472	1VCS009471
Operating temperature	[°C]	-30 ... + 40	-30 ... + 40
Tropicalization	IEC: 60068-2-30	•	•
	721-2-1	•	•
Electromagnetic compatibility	IEC 60694	•	•

Circuit breaker		**VM1/A/LR**
OneFit		**W600**
Standards	C37.04	•
Rated voltage	Ur [kV]	05-15
Rated insulation voltage	Us [kV]	05-15
Withstand voltage at 50 Hz	Ud (1 min) [kV]	19-36
Impulse withstand voltage	Up [kV]	60-95
Rated frequency	fr [Hz]	50-60
Rated normal current (40 °C)	(1) Ir [A]	2000
Rated breaking capacity (rated symmetrical short-circuit current - 5 cycles)	Isc [kA]	40
Rated-short time withstand current (3 s)	Ik [kA]	40
Making capacity	Ip [kA]	104
Operation sequence	[O-0.3s-CO-3min-CO]	•
Opening time	[ms]	40 … 70
Arc duration	[ms]	8 … 13
Total interruption time	[ms]	45 … 60 < 83
Closing time	[ms]	45 … 80
Mechanical operations (cycles)	Actuator [No]	… 50,000
	Interrupters [No]	… 30,000
Electrical operations (cycles)	Rated current [No]	… 30,000
	Under short circuit [No]	… 100
Maximum overall Dimensions 	H [mm/inch]	692/27.2
	W [mm/inch]	503/19.8
	D [mm/inch]	662/26
	Pole centre distance I [mm/inch]	150/5.9
Weight	[kg/lb]	197/434
Standardized table of dimensions		1VCS009471
Operating temperature	[°C]	-30 … + 40
Tropicalization	IEC: 60068-2-30	•
	721-2-1	•
Electromagnetic compatibility	IEC 60694	•

4. General characteristics of withdrawable circuit breakers

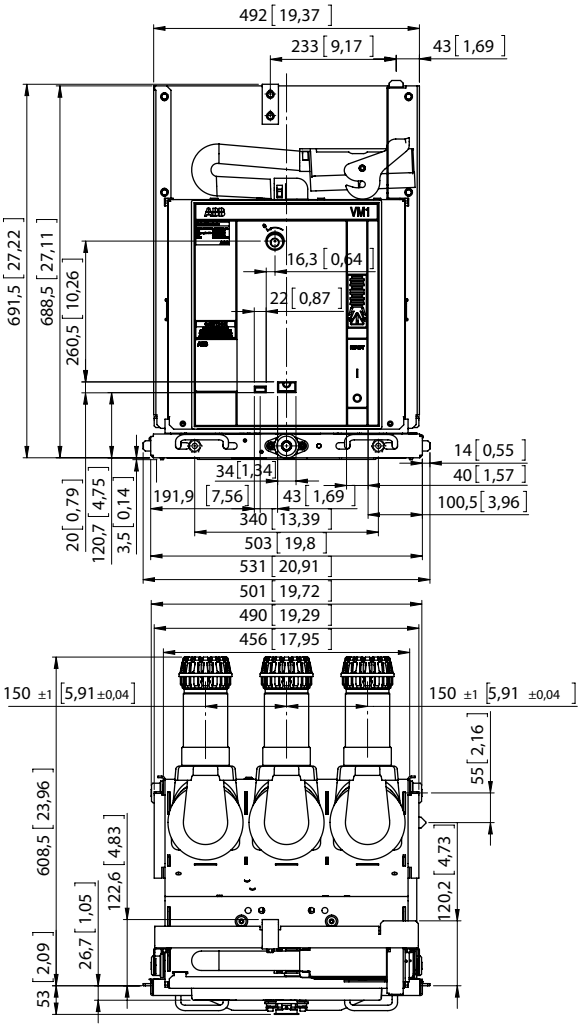
Circuit breaker		**VM1/A/LR**	**VM1/A/LR**	**VM1/A/LR**	**VM1/A/LR**
OneFit		**W700-W800**	**W700-W800**	**W700-W800**	**W700-W800**
Standards	C37.04	•	•	•	•
Rated voltage	Ur [kV]	05-15	05-15	15	15
Rated insulation voltage	Us [kV]	05-15	05-15	15	15
Withstand voltage at 50 Hz	Ud (1 min) [kV]	19-36	19-36	36	36
Impulse withstand voltage	Up [kV]	60-95	60-95	95	95
Rated frequency	fr [Hz]	50-60	50-60	50-60	50-60
Rated normal current (40 °C)	(1) Ir [A]	1200	2000	2000	2000
	Isc [kA]	40	40	25	31.5
Rated breaking capacity (rated symmetrical short-circuit current - 5 cycles)					
Rated-short time withstand current (3 s)	Ik [kA]	40	40	25	31.5
Making capacity	Ip [kA]	104	104	65	82
Operation sequence	[O-0.3s-CO-3min-CO]	•	•	•	•
Opening time	[ms]	40 ... 70	40 ... 70	40 ... 70	40 ... 70
Arc duration	[ms]	8 ... 13	8 ... 13	8 ... 13	8 ... 13
Total interruption time	[ms]	45 ... 60 < 83	45 ... 60 < 83	45 ... 60 < 83	45 ... 60 < 83
Closing time	[ms]	45 ... 80	45 ... 80	45 ... 80	45 ... 80
Mechanical operations (cycles)	Actuator [No]	... 50,000	... 50,000	... 50,000	... 50,000
	Interrupters [No]	... 30,000	... 30,000	... 30,000	... 30,000
Electrical operations (cycles)	Rated current [No]	... 30,000	... 30,000	... 30,000	... 30,000
	Under short circuit [No]	... 100	... 100	... 100	... 100
Maximum overall Dimensions 	H [mm/inch]	692/27.2	692/27.2	692/27.2	692/27.2
	W [mm/inch]	653/25.7	653/25.7	653/25.7	653/25.7
	D [mm/inch]	640.5/25.2	640.5/25.2	640.5/25.2	640.5/25.2
	Pole centre distance I [mm/inch]	210/8.26	210/8.26	210/8.26	210/8.26
Weight	[kg/lb]	213/470	222/490	222/490	222/490
Standardized table of dimensions		1VCS012530	1VCS012531	1VCS012531	1VCS012531
Operating temperature	[°C]	-30 ... + 40	-30 ... + 40	-30 ... + 40	-30 ... + 40
Tropicalization	IEC: 60068-2-30	•	•	•	•
	721-2-1	•	•	•	•
Electromagnetic compatibility	IEC 60694	•	•	•	•

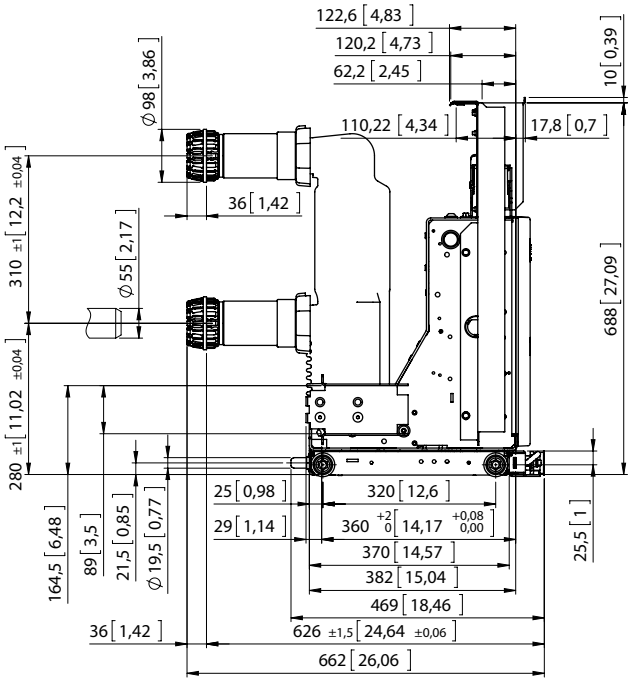
Circuit breaker		**VM1/A/LR**	**VM1/A/LR**	**VM1/A/LR**
OneFit		**W700-W800**	**W800**	**W800**
Standards	C37.04	•	•	•
Rated voltage	Ur [kV]	05-15	05-15	05-15
Rated insulation voltage	Us [kV]	05-15	05-15	05-15
Withstand voltage at 50 Hz	Ud (1 min) [kV]	19-36	19-36	19-36
Impulse withstand voltage	Up [kV]	95	95	95
Rated frequency	fr [Hz]	50-60	50-60	50-60
Rated normal current (40 °C)	(1) Ir [A]	1200	2000	3000 (2)
Rated breaking capacity (rated symmetrical short-circuit current - 5 cycles)	Isc [kA]	50	50	50
Rated-short time withstand current (3 s)	Ik [kA]	50	50	50
Making capacity	Ip [kA]	130	130	130
Operation sequence	[O-0.3s-CO-3min-CO]	•	•	•
Opening time	[ms]	40 … 70	40 … 70	40 … 70
Arc duration	[ms]	8 … 13	8 … 13	8 … 13
Total interruption time	[ms]	45 … 60 < 83	45 … 60 < 83	45 … 60 < 83
Closing time	[ms]	45 … 80	45 … 80	45 … 80
Mechanical operations (cycles)	Actuator [No]	… 50,000	… 50,000	… 50,000
	Interrupters [No]	… 30,000	… 30,000	… 30,000
Electrical operations (cycles)	Rated current [No]	… 30,000	… 30,000	… 30,000
	Under short circuit [No]	… 100	… 100	… 100
Maximum overall Dimensions 	H [mm/inch]	692/27.2	692/27.2	692/27.2
	W [mm/inch]	653/25.7	653/25.7	653/25.7
	D [mm/inch]	643/25.3	643/25.3	644/25.4
	Pole centre distance I [mm/inch]	210/8.26	210/8.26	210/8.26
Weight	[kg/lb]	247/545	247/545	247/545
Standardized table of dimensions		1VCS012380	1VCS012380	2RDA040089
Operating temperature	[°C]	-30 … + 40	-30 … + 40	-30 … + 40
Tropicalization	IEC: 60068-2-30	•	•	•
	721-2-1	•	•	•
Electromagnetic compatibility	IEC 60694	•	•	•

1) Rated uninterrupted currents guaranteed with withdrawable circuit breaker installed with air temperature of 40 °C.
2) 3000A with air forced ventilation in OneFit frame
2500A with air natural ventilation

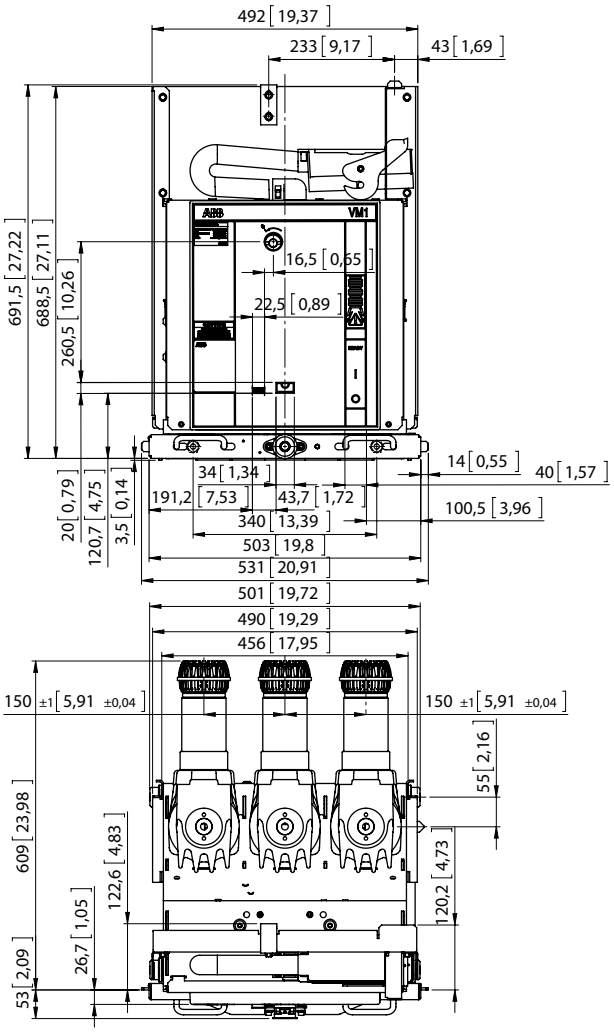
5. Overall dimensions

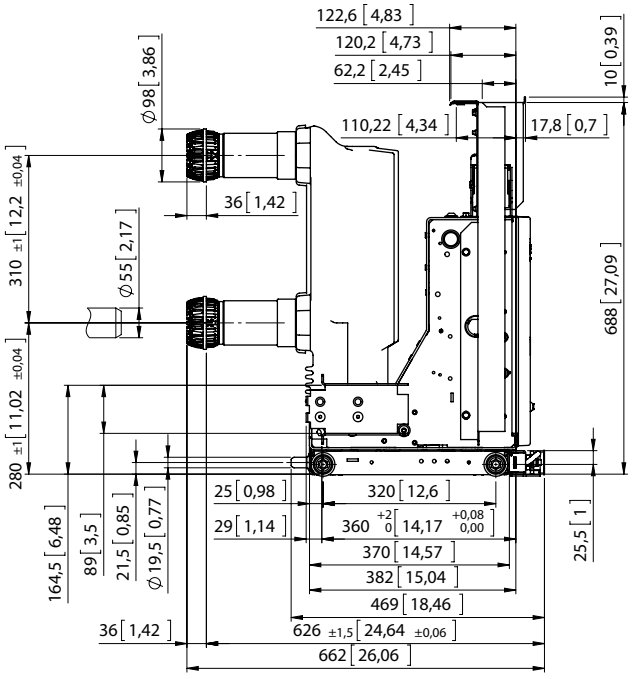
VM1/A/LR – 1VCS009472
05-15kV - 1200A – 40kA





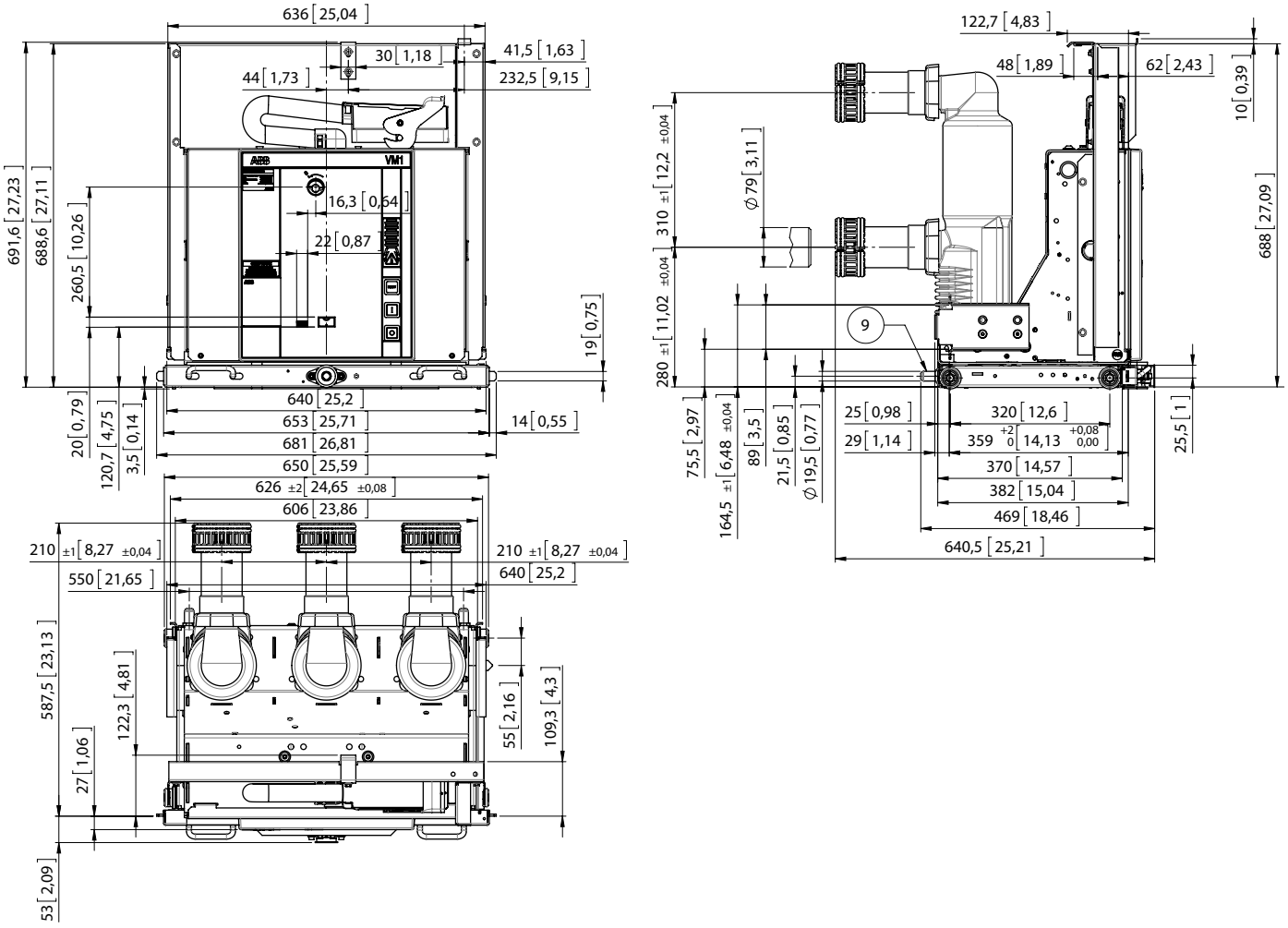
VM1/A/LR – 1VCS009471
05-15kV - 2000A – 31.5-40kA



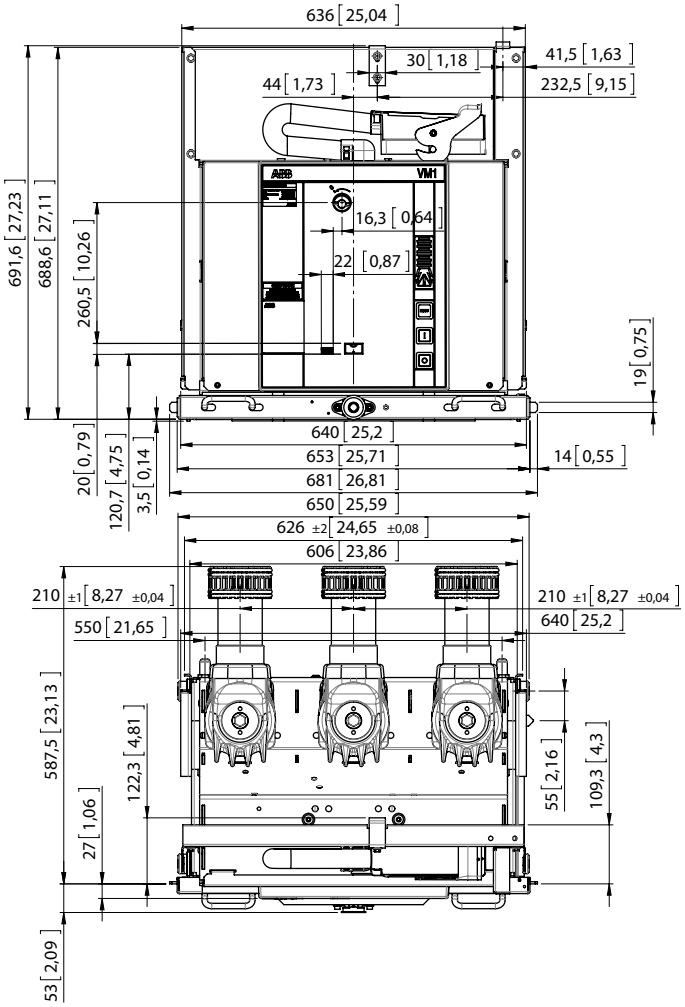


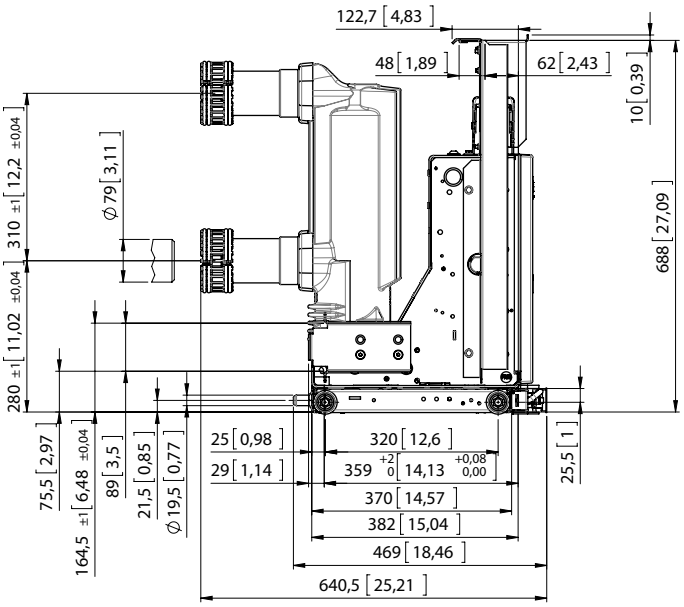
5. Overall dimensions

VM1/A/LR – 1VCS012530
05-15kV - 1200A – 40kA



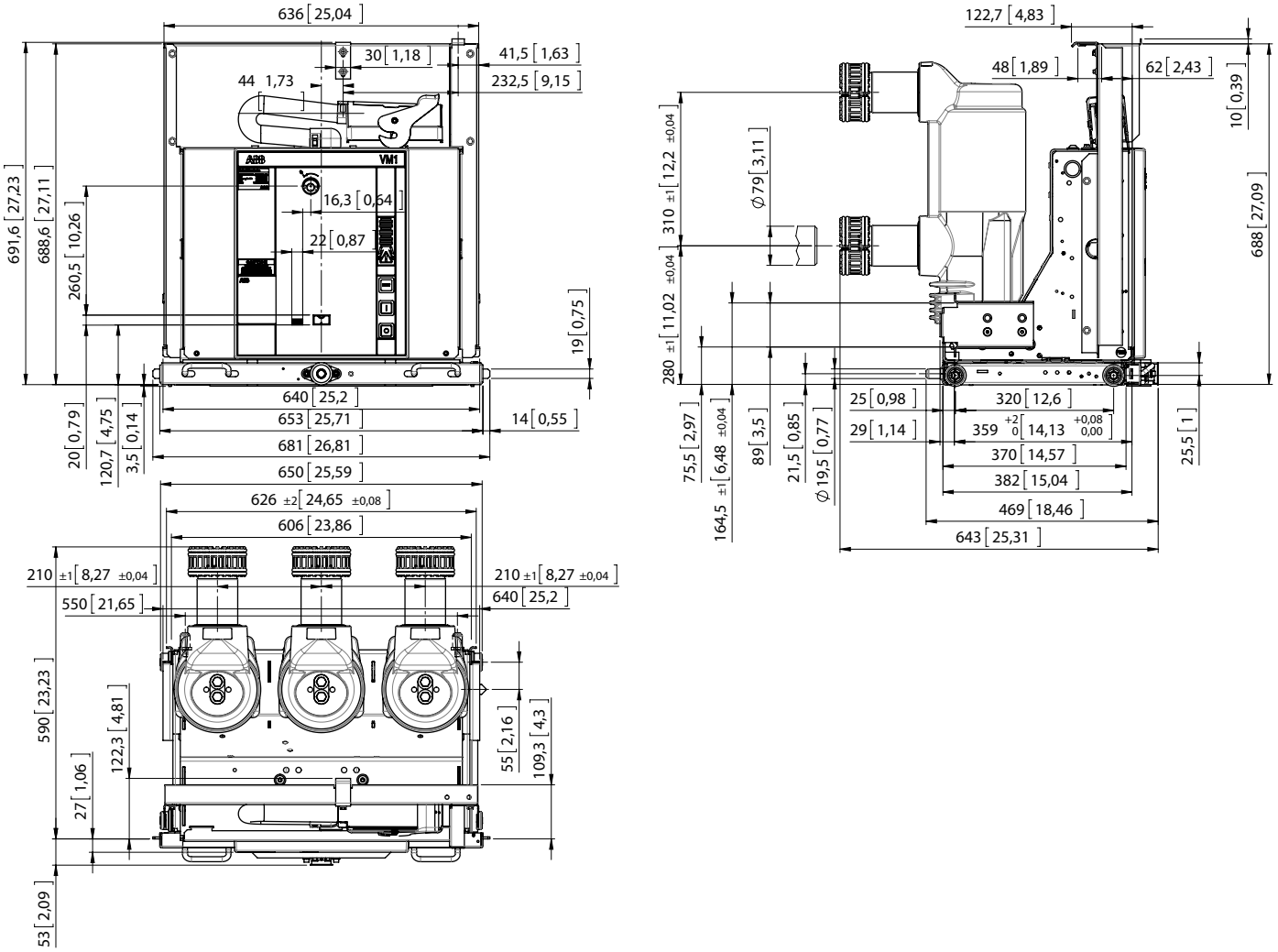
VM1/A/LR – 1VCS012531
05-15kV - 2000A – 25-31.5-40kA



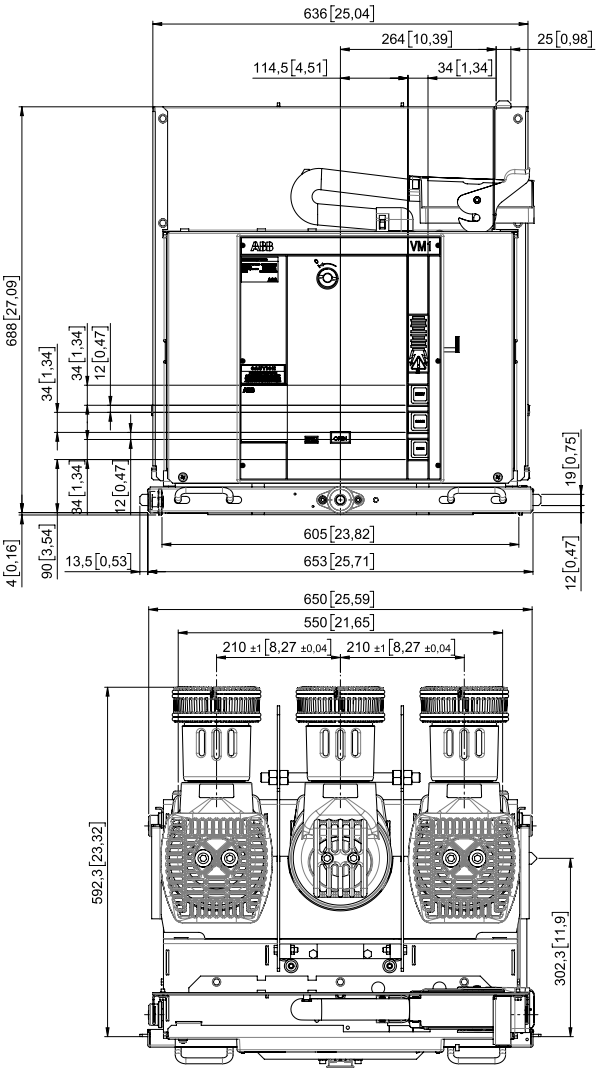


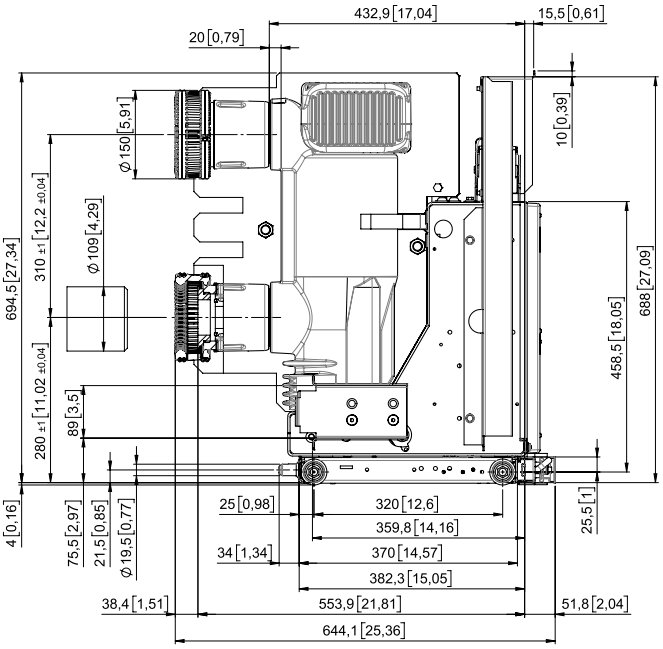
5. Overall dimensions

VM1/A/LR – 1VCS012380
05-15kV - 1200A-2000A – 50kA



VM1/A/LR – 2RDA040089
05-15kV - 3000A AF – 50kA (1)





6. Maintenance

DANGER

Maintenance must be carried out either by ABB Service personnel or by qualified skilled personnel.
For the circuit breaker installation operations, maintenance, periodic checks and spare parts also refer to the technical documentation of the circuit breaker.
The racking-in/out operations must always be carried out with the circuit breaker open.

DANGER

There are hazards of electrical shocks and/or burns whenever working in or around electrical equipment. Turn off power ahead of the switchgear before performing any inspection or maintenance operations. Check incoming line terminals to verify that the equipment is de-energized and grounded. check out-going terminals to ensure that no back-feedcondition exists.

CAUTION

Before carrying out any operations, always make sure that the circuit breaker is open, the capacitor discharged and that it is not supplied (medium voltage circuit and auxiliary circuits).

DANGER

Always work with the circuit breaker open and locked so that it cannot be closed again, with the work area insulated and made safe. All power supply sources must be disconnected and made safe against any reclosing during removal and installation work.

Should the customer's personnel be in charge of maintenance, the customer is responsible for any operation performed on the apparatus.
When performing routine checks and maintenance operations, de-energize all the components.
Always work with the circuit breaker open and locked so that it cannot be closed again, with the work area insulated and made safe. All power supply sources must be disconnected and made safe against any reclosing during removal and installation work.
The spare parts shown in the "List of spare parts/ accessories of the relevant apparatus manual" table can only be replaced **by ABB Service personnel.** For the apparatus, consult the relevant manual.
Use original spare parts only.

6.1. Maintenance program

Levels:
- Act: activities to be carried out by trained personnel
- Perform: activities to be carried out by ABB certified technicians

Maintenance level	Suggested time interval
Act	1 year or 5000 operations (whichever comes first)
Perform	5 years or 5000 operations (whichever comes first)

Please check the SWAPs maintenance program for a more detailed and fine-tuned time schedule based on your specific environmental and operational conditions.

Note for ANSI standards

Do not use alcohol or freon. Limit the use of solvents to removing grease and conductors, insulation and unpainted metallic surfaces.
Use an OSHA approved, non flammable solvent with a threshold limit of 300 PPM or higher in accordance with local regulations.
Use solvents in well-ventilated areas.

Note: Take care not to remove or tarmish platling.

Level	Activity
Act	**General inspection on:** • Magnetic drive • Medium voltage parts • Earthing connections • Auxiliary supply voltage Check auxiliary switches Test interlock conditions General servicing of switching device • Clean surfaces in general • Clean insulating material surfaces and conductive components • Clean and lubricate pawls, support shafts and bearing surfaces **Suspect Joint maintenance (if needed)** • Open joint and inspect connection surfaces • Clean surfaces • Replace parts if necessary • Replace contact fingers springs if necessary • Tighten bolted connections **Functional Testing** • Perform several switching operations under no load • Open C.B. and discharge the capacitors • Examine the condition of lubrication • Check the proper mechanical/electrical sequence
Perform	**Servicing of the operating mechanism** • Open C.B. and discharge the capacitors • Replace climatic and mechanical sensitive parts • Check the fit and tightness of fasteners • Replace removed spring lock washers, split pins and other fasteners • Check the general condition of the magnetic drive • Perform comprehensive mechanical and electrical functional tests • Check tightness of bolted joints **Measure closing and opening time main contacts simultaneous operation.** **Measure primary circuits contact resistance.** **Measure the insulation resistance (if needed)**

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For further details please contact:

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More product information:
abb.com/mediumvoltage
Your contact center:
abb.com/contactcenters
More service information:
abb.com/service

1VCS012379 – Rev. B, en – VM1/A/LR Addendum instruction manual – 2020.06 (gs)