GenieEvo -
Installation, Operation and Maintenance Guide

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Details of revision

Version	Comment	Date
1.0	First Issue	April 2003
2.0	Padlock interlock operation added. Busbar earth panel added.	August 2003
2.1	Live primary VT isolation added. And ENA comments incorporated.	April 2004
3.0	Withdrawable VT fuse option added. Weights of options added	March 2005
4.0	Addition of 2500A	May 2011
5.0	Update contact details. Amend kit reference numbers.	August 2013

Genie*Evo*
general

Introduction

These instructions cover all operations concerning handling, installation, operation and maintenance of the Genie*Evo* range of equipment.

The range comprises:-

- VC2 200A circuit breaker
- VC6 630A circuit breaker
- VC12 1250A circuit breaker
- VB6 630A bus section
- VB12 1250A bus section.
- VBES busbar earthing panel
- BBVT busbar VT panel
- BBM busbar metering panel
- VC20/25 circuit breaker
- VB20/25 bus section

Weights and dimensions

unit(s)	VC2, VC6, VC12, VBES, BBVT	VB6, VB12	VC20, VC25	VB20, VB25
	Standard	Bus-section	Standard	Bus-section
Average dimensions (mm)	500W, 1900H, 1230D	1000W, 1900H, 1230D	750W, 1900H, 1230D	1250W, 1900H, 1230D
packed	*600W, 200H, 1330D*	*1100W, 2000H, 1330D*	*850W, 2000H, 1330D*	*1350W, 2000H, 1330D*
Average weight (kg)	365kg	560kg	550kg	800kg
packed	*465kg*	*660kg*	*650kg*	*900kg*
Maximum weight (kg)*	650kg	835kg	700kg	1000kg
packed	750kg	850kg	900kg	1100kg

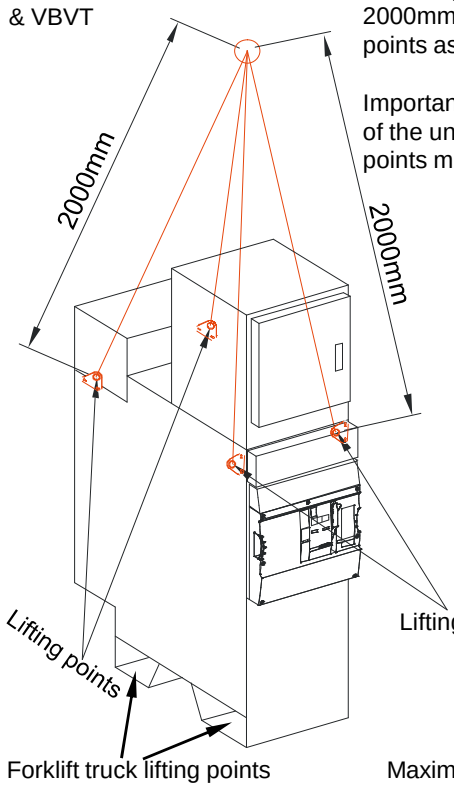
* Maximum weight includes for a single freestanding unit which includes all available options, such as inverted cable box, voltage transformers, surge arresters, busbar connected cable box, motors etc.

GenieEvo lifting instructions

Panel types:
VC2, VC6, VC12, VBES,
& VBVT

Note: Lifting chains/ropes shall be positioned at 2000mm from the lifting points as shown.

Important: during the lifting of the unit, all four lifting points must be used



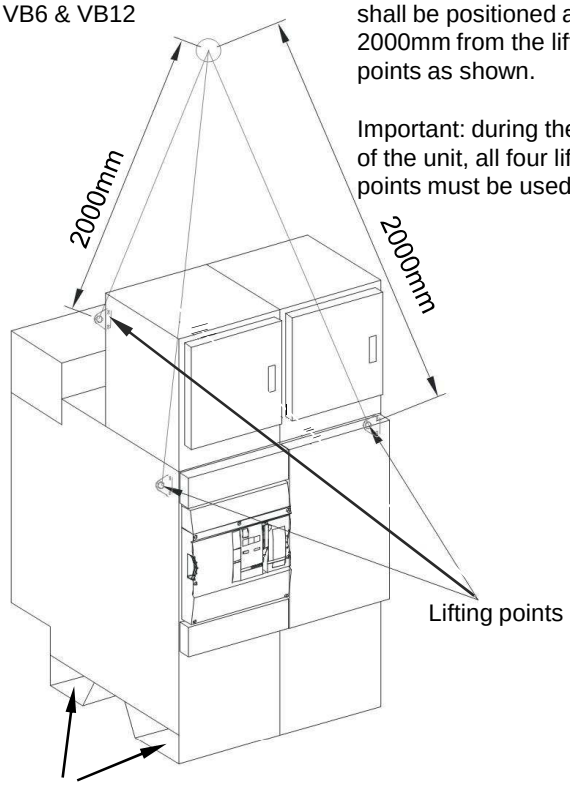
Forklift truck lifting points

Maximum mass = 650kg

Panel types:
VB6 & VB12

Note: Lifting chains/ropes shall be positioned at 2000mm from the lifting points as shown.

Important: during the lifting of the unit, all four lifting points must be used



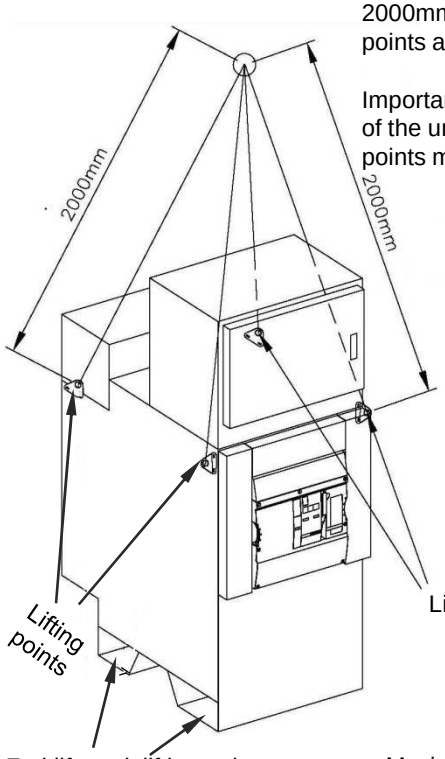
Forklift truck lifting points

Maximum mass = 750kg

Panel types:
VC20, VC25

Note: Lifting chains/ropes shall be positioned at 2000mm from the lifting points as shown.

Important: during the lifting of the unit, all four lifting points must be used



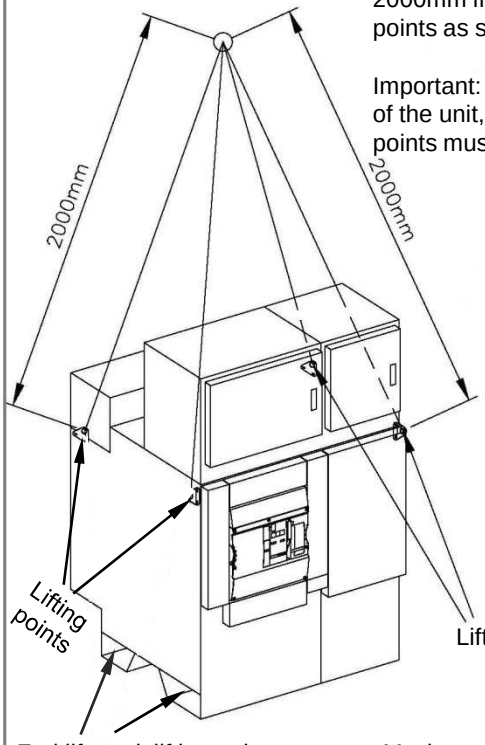
Forklift truck lifting points

Maximum mass = 835kg

Panel types:
VB20, VB25

Note: Lifting chains/ropes shall be positioned at 2000mm from the lifting points as shown.

Important: during the lifting of the unit, all four lifting points must be used



Forklift truck lifting points

Maximum mass = 1000kg

Moving

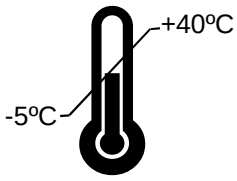
All units can be moved by forklift truck or pallet truck using the integral feet at the bottom of each panel. Fork length should be more than the width of a panel. Please refer to pages 13 and 14 for further information.

Storage

These units are designed for indoor use only and must not be left outdoors. It is therefore necessary to protect the equipment from the environment before and during erection/commissioning. The unit should be stored in a warm, dry switchroom and protected against dust and debris.

The switchgear panels should not be stored or installed in unfinished switchrooms where the climatic conditions would exceed those specified in IEC62271-1 normal service conditions for indoor use

-5 to +40ºC



Relative Humidity <90%

Indoors

Should the busbar chamber or cable box become exposed to the elements, they should be thoroughly cleaned prior to energising with Isopropanol alcohol.

Ancillary kits

Ancillary kits containing busbars, dyscon boots, glands, screws etc. are either supplied loose with each unit, fastened to the panel, or secured in the cable box.

Warranty

Standard warranty of 24 months from date of production, or 18 months from date of commissioning, whichever ends first.

Other warranty terms are available. Please enquire with your Schneider Sales Representative.

Installation for internal arc protection

To maximise the reliability of the switchgear throughout its life the switchgear should be installed in a clean, dry, well ventilated, indoor switchroom whose climatic conditions are controlled to stay within those specified in IEC62271-1 clause 2.1.1.

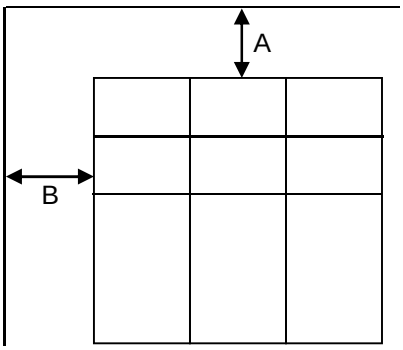
If special service conditions are required contact Schneider Electric for further advice.

Internal Arc

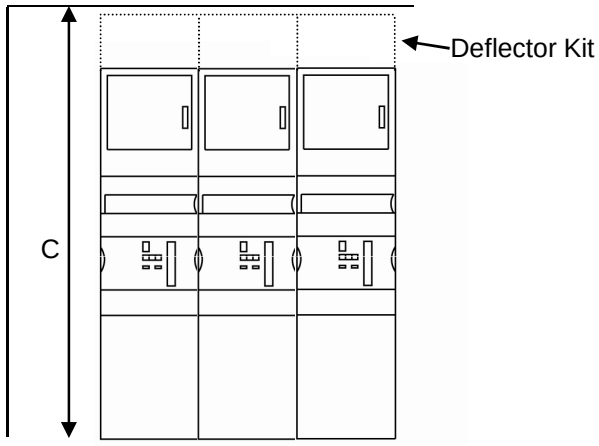
The standard GenieEvo product range has an internal arc classification of IAC-AF 25kA 1s when tested to IEC 62271-200.

Our recommendation for installation is as follows

Top View



Front View



Minimum Dimensions

A	800mm
B	500mm
C	3000mm

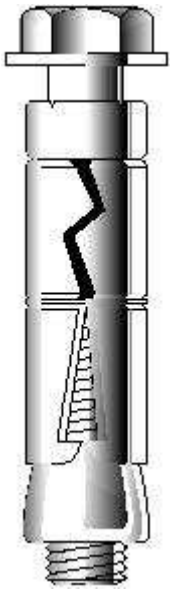
Front deflector kit reference GDV-A328 is required if
A = 800mm – 1500mm
or
C = 3000mm – 4000mm

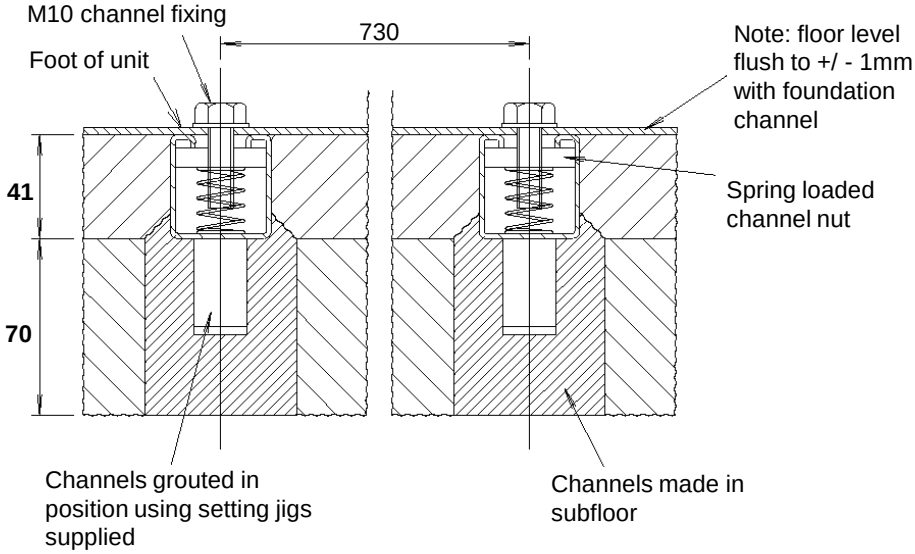
If A>1500mm and C>4000mm no deflector is required

For the 200A, 630A and 1250A panels
internal arc classification of AFLR is
possible by adding kit references
F758 Incomer or feeder
F762 Bus section

Floor preparation

Please refer to the arrangement drawing for the foundation details.





The units can be directly bolted to the concrete floor by use of 2 x 10mm rawlbolts for single width panels or 4 x 10mm rawlbolts for bus-section panels. The floor tolerance is ±1mm over 1 metre

Where it is not possible to guarantee that the floor is within the specified tolerance, we strongly recommend the use of foundation channels i.e. Unistrut P3270 or similar.

Installation of circuit breaker panel

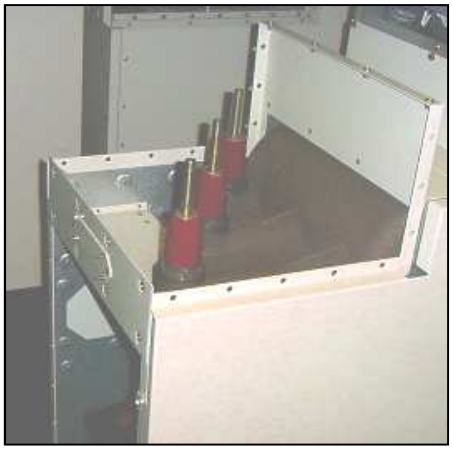
Line up the first panel in position (see Unistrut diagram). Insert 2 channel nuts into the Unistruts shown and slide into position. Finger tighten the M10 screws at the front and rear of the unit (do not tighten). Manoeuvre the next panel into position and repeat.

If the panel is being bolted directly to the floor, line up the first panel in position and remove the lower panel front plate. Drill front and back fixing position's through the access holes. The recommended drill size is 16mm ø. Install rawlbolts, (shown above). Finger connect the M10 nuts and washers. Manoeuvre the next panel into position and repeat.

Nylon hole plug to be fitted from the underside of the base to ensure vermin proofing.

Connection of panels VC2-12, VB6-12

Remove the busbar chamber top and rear cover plate. To remove undo the M6 captive screws along the top and rear of the busbar chamber cover.

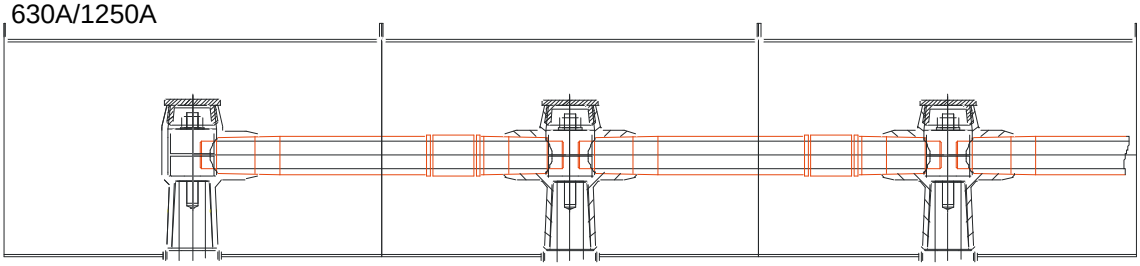


With the busbar chamber cover removed, bolt the panel busbar chamber flanges together using 16 off M8 screws and nuts via the flange holes along the lower and front edges.

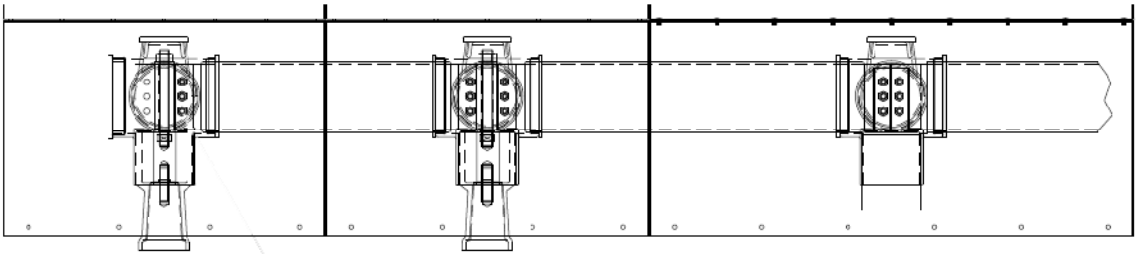
Repeat until all panels within the switchboard have been installed and bolted together.

Connection of busbars

630A/1250A



2500A



Ensure that the environment is clean and dry.

Clean busbar and bushing contact surfaces using cleaning pad provided. Apply silicon grease* to boots. Fit busbars into boots as shown above.

** Silicone Paste type:*
Unisilkon TKM 1011
Part No. 2D58121

Refer to accessory kits for full details.

note: it is recommended prior to refitting the busbar chamber covers that the busbars are tested - see page 38/39 for typical tests

Busbar torque

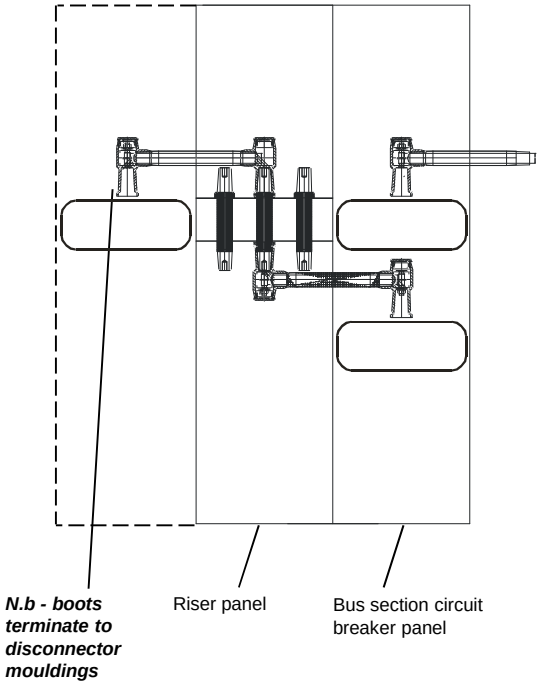
630A/1250A Totally encapsulated 56Nm

1250A Totally encapsulated with earth screening 75Nm

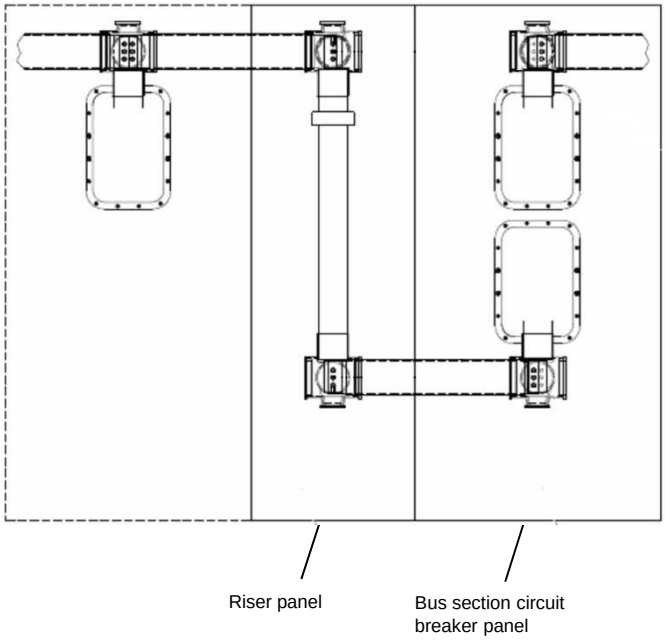
2500A Totally encapsulated 28Nm

Arrangement of bus-section busbars
connection of busbars totally encapsulted/earth screened

Rear view (1250A)

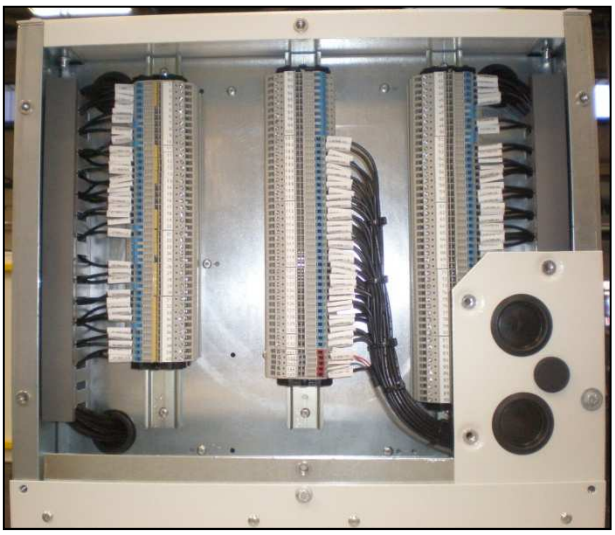


Rear view (2500A)



Ensure that the environment is clean and dry
Remove busbar boot and clean bushings using cleaning pad provided. Apply *Silicone Paste type:- Unisilkon TKM 1011, Part No. 2D58121* to boots. Fit busbars into boots as shown below.

Refer to accessory kits for full details.



Installation of pilot cables through pilot cable box

Remove the pilot cable box cover. To remove undo the 10 x M6 captive screws along the top and rear of the pilot cable box cover. Pilot cables can be installed from above using the pre-punched gland plate with various sized mechanical knockouts.

Cable size

Standard cable box can accommodate 3 core cables up to 300mm² and single core cables to 630mm².

WARNING – All cables must be connected. We recommend the following kits - Raychem cold fit termination boot RCAB4120 3M cold fit termination boot 92EE 717-1. Heat shrink to apply direct Raychem EAKT1508, 1509 or 1510. For dyscon connection EAKT 1505, 1506 or 1507.

Main cable connection

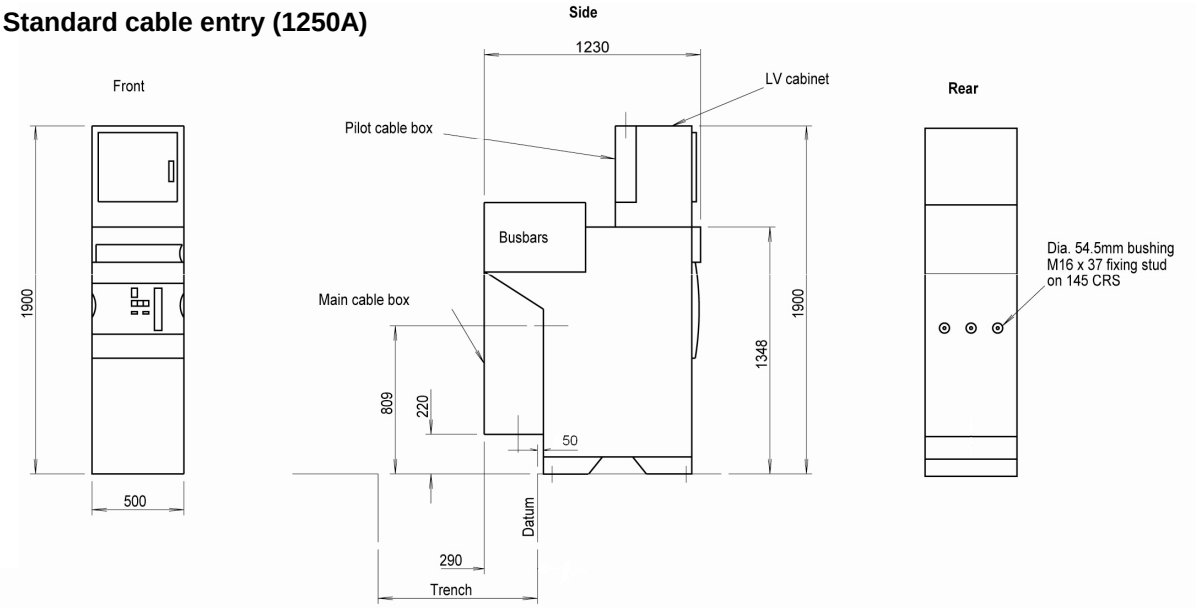
All units are fitted with dry type cable connections suitable for accepting shrink fit termination kits. Accessory kits containing gland plates etc are available.

Cable termination torque = 65Nm

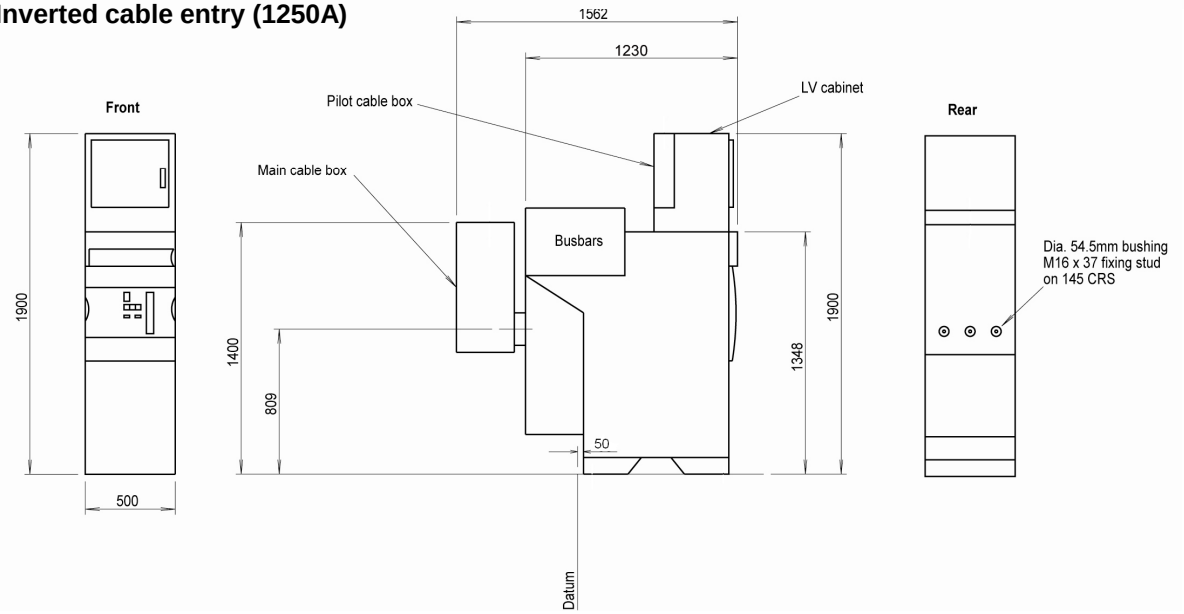
Ensure that the cable is supported by gland plate before placing on bushings. Failure to do so combined with the physical stresses which could be encountered during termination may result in damage to the resin insulation.

note*: L1 phase bushing is on rear right of the unit*

Standard cable entry (1250A)

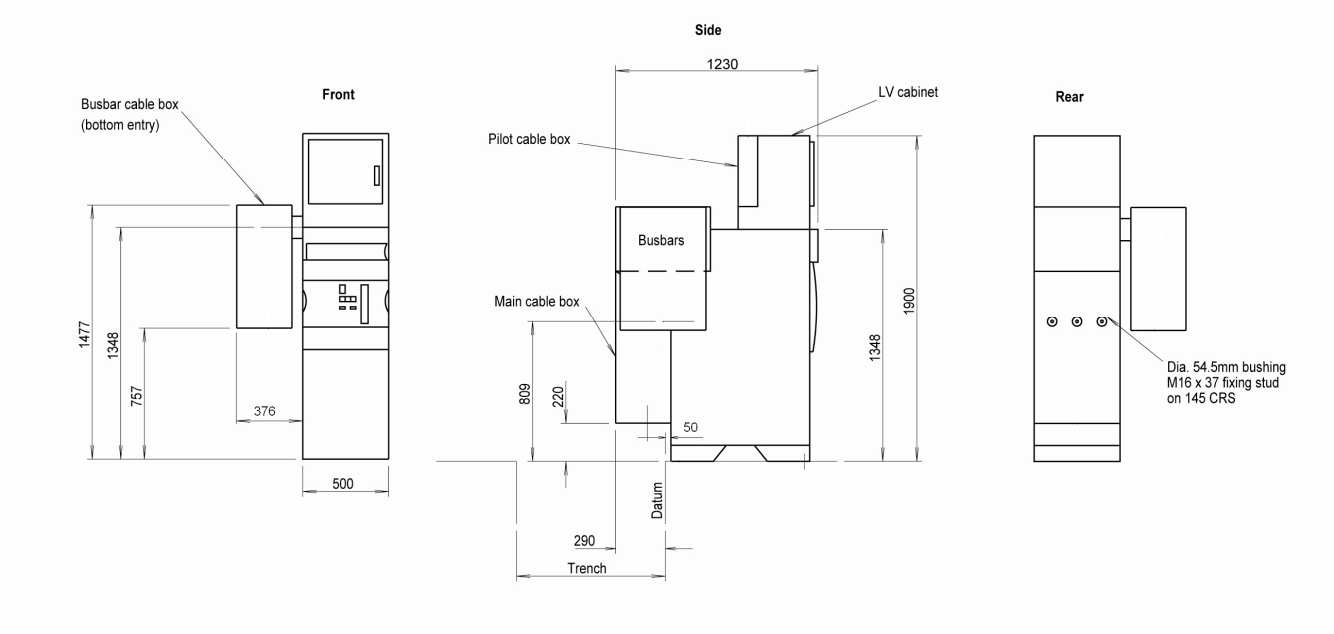


Inverted cable entry (1250A)

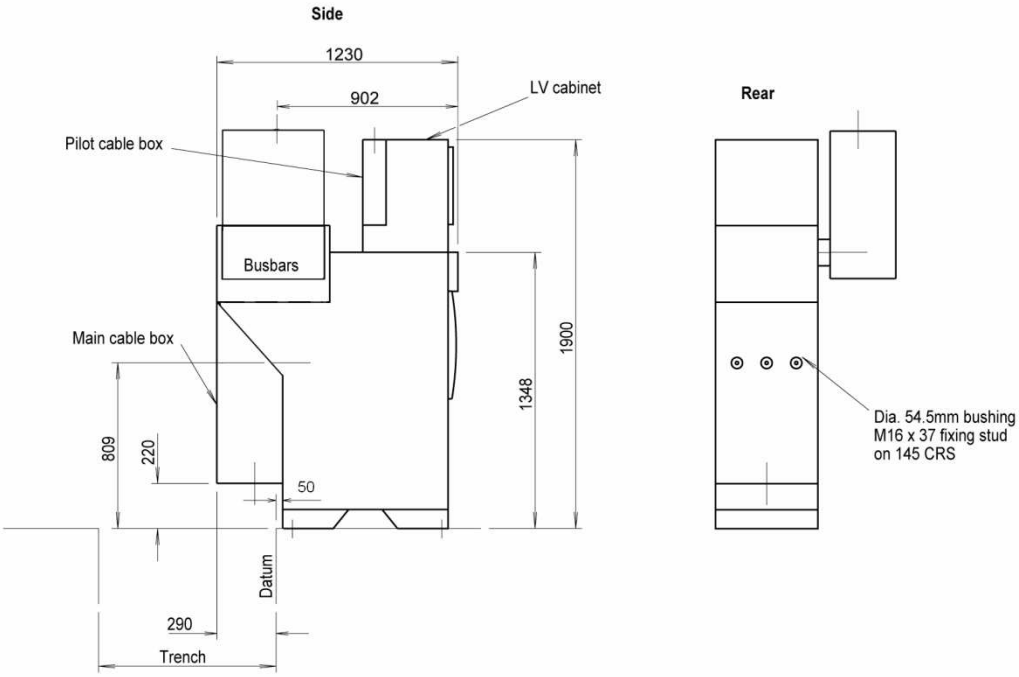


Bus end cable box connection

standard cable entry (1250A)

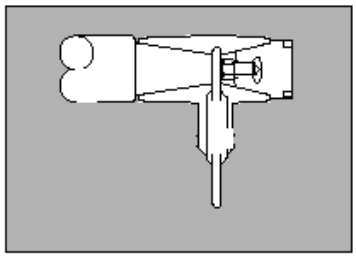


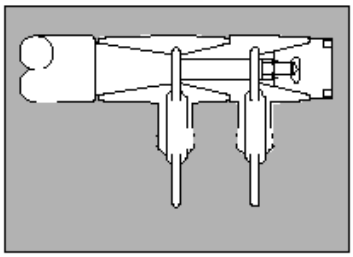
Inverted cable entry (1250A)



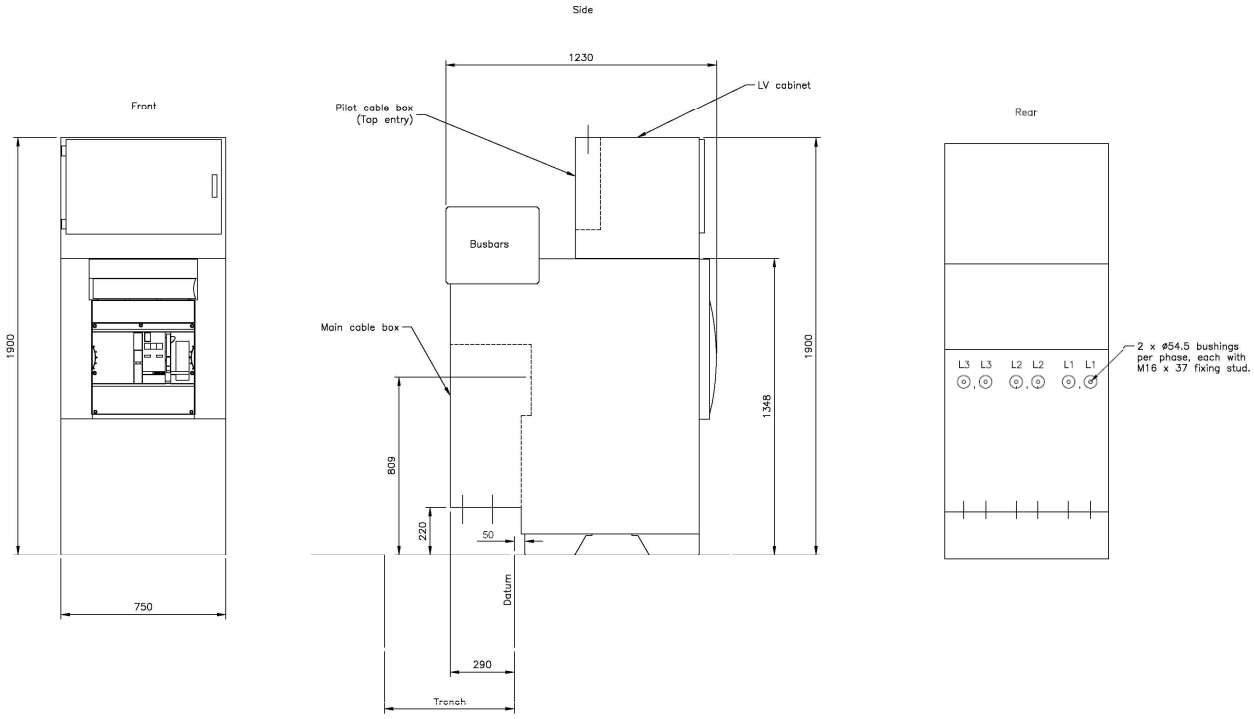
Dyscon elbow adapters
Can be used for single or double cable connection

note: *hole size in the dyscon palm is Ø14mm for M12 fixing*

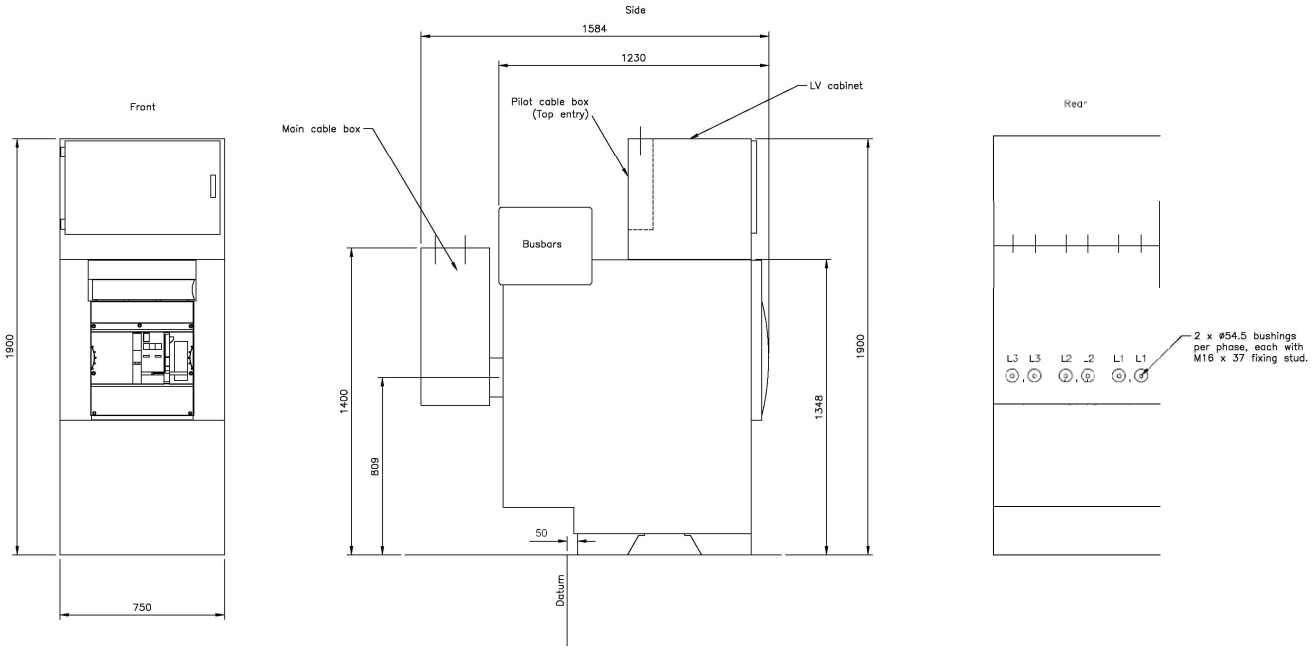




Standard cable entry (2500A)

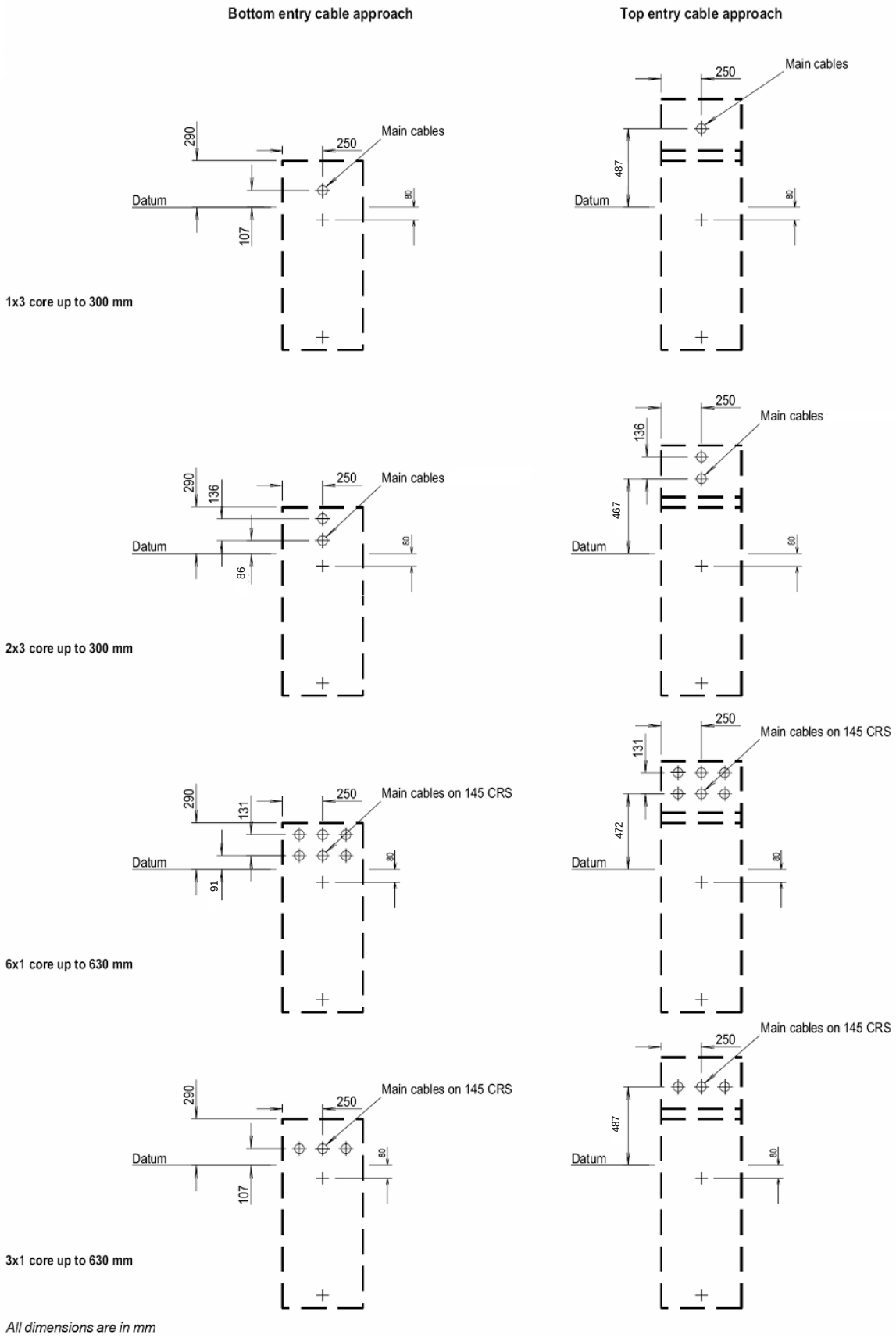


Inverted cable entry (2500A)



Always clamp the cable with the appropriate glanding system before connecting the cable to the bushing. Failure to support the cable properly will put unacceptable stress on the bushing and could damage the bushing, leading to possible equipment failure. The weight of the cable must always be supported by the cable gland.

Fixing points

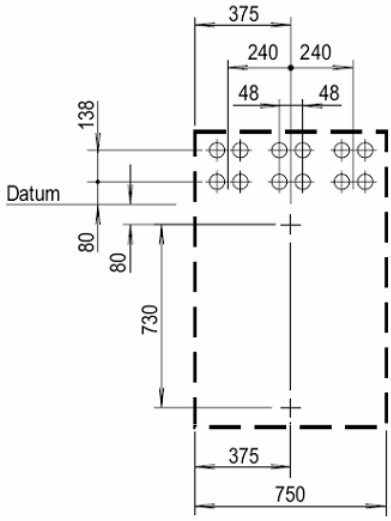


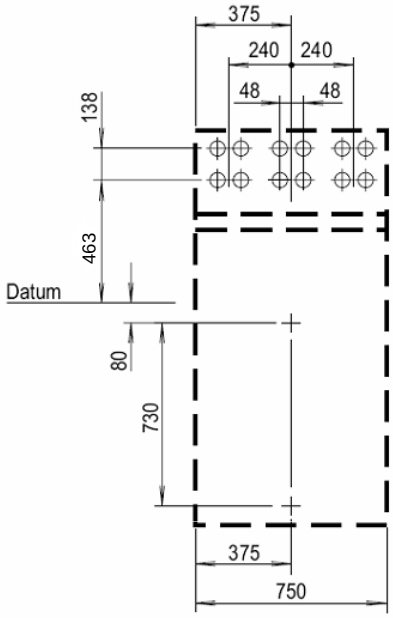
Fixing points continued

Bottom entry cable approach

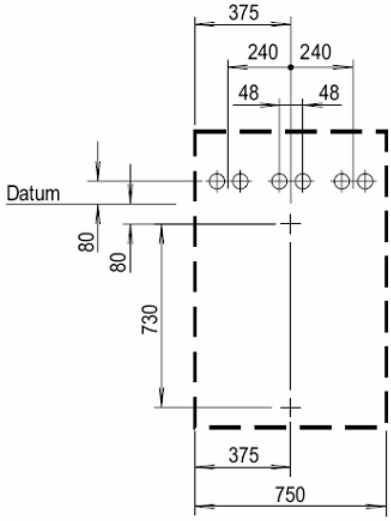
Top entry cable approach

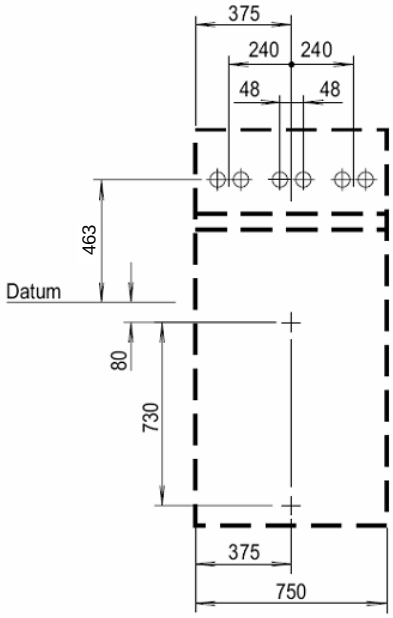
12x1 core up to 630 mm





6x1 core up to 630 mm





All dimensions are in mm

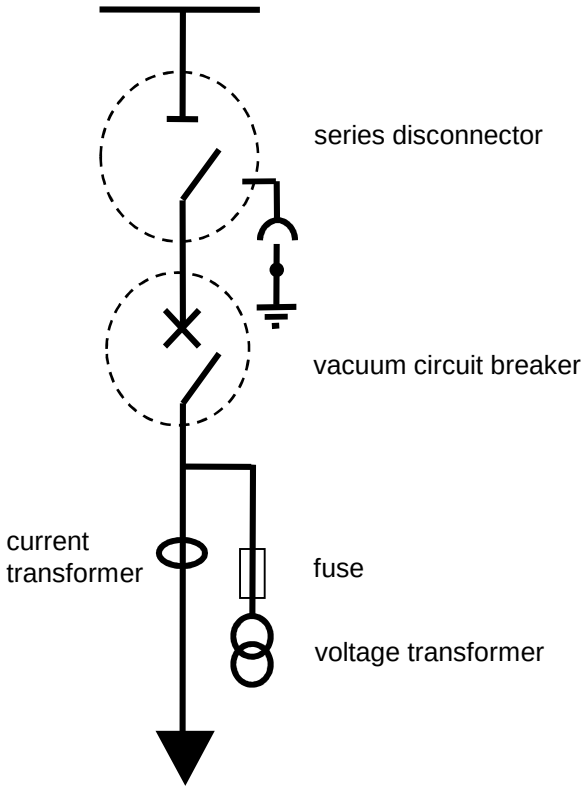
Architecture
Circuit connected panel

GenieEvo consists of a (demountable) fixed pattern vacuum circuit breaker with a series, 3 position, disconnector between the vacuum circuit breaker (CB) and the busbars.

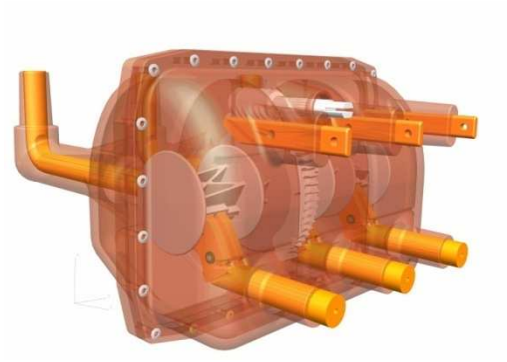
The series disconnector is an off load device which is interlocked and can only be moved from one position to another with the circuit breaker in the OFF position.

An interlock prevents the circuit breaker from being closed if the series disconnector is part way between one of its three positions.

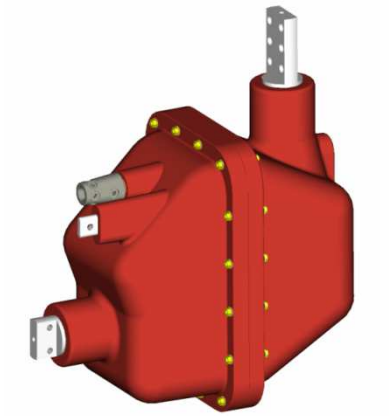
All load and fault current interruption is carried out by the vacuum circuit breaker.



vacuum circuit breaker



630A/1250A 3 position 3 phase series disconnector



2500A 3 position single phase series disconnector

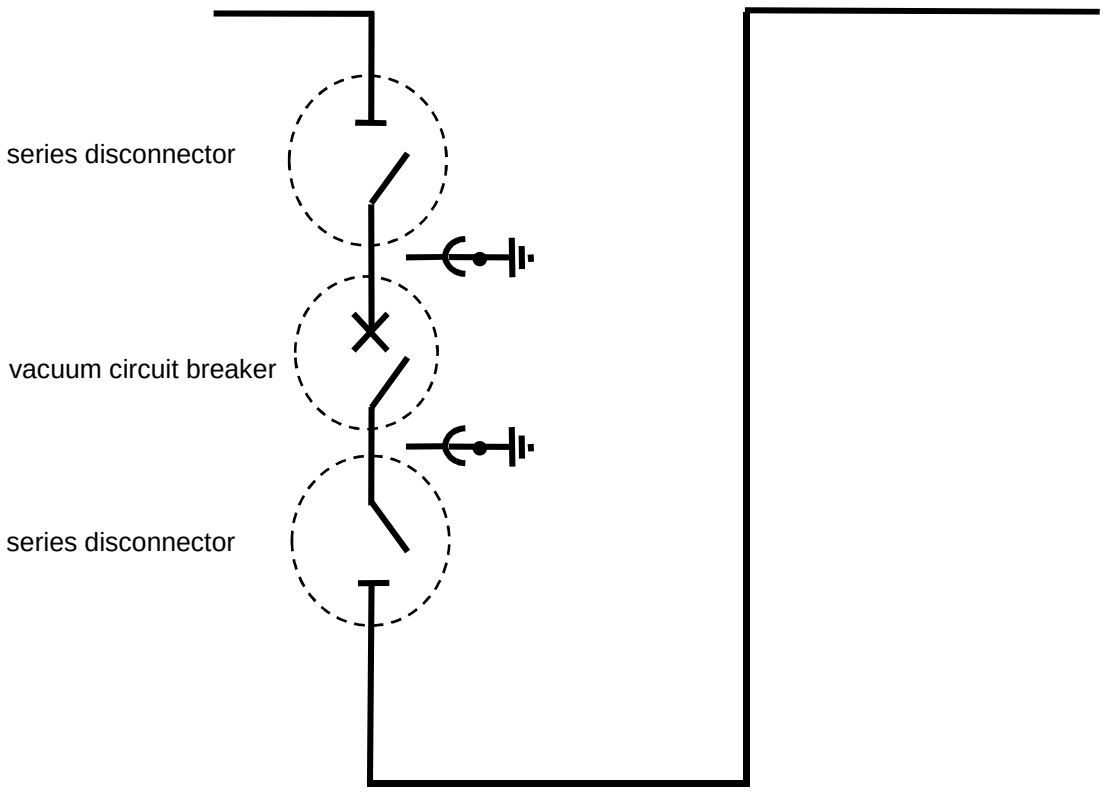
Architecture
Busbar connected panel

The bus section panel consists of a (demountable) fixed pattern vacuum circuit breaker with a series disconnector on either side.

The series disconnectors are off load devices which can only be moved from one position to another with the circuit breaker in the OFF position.

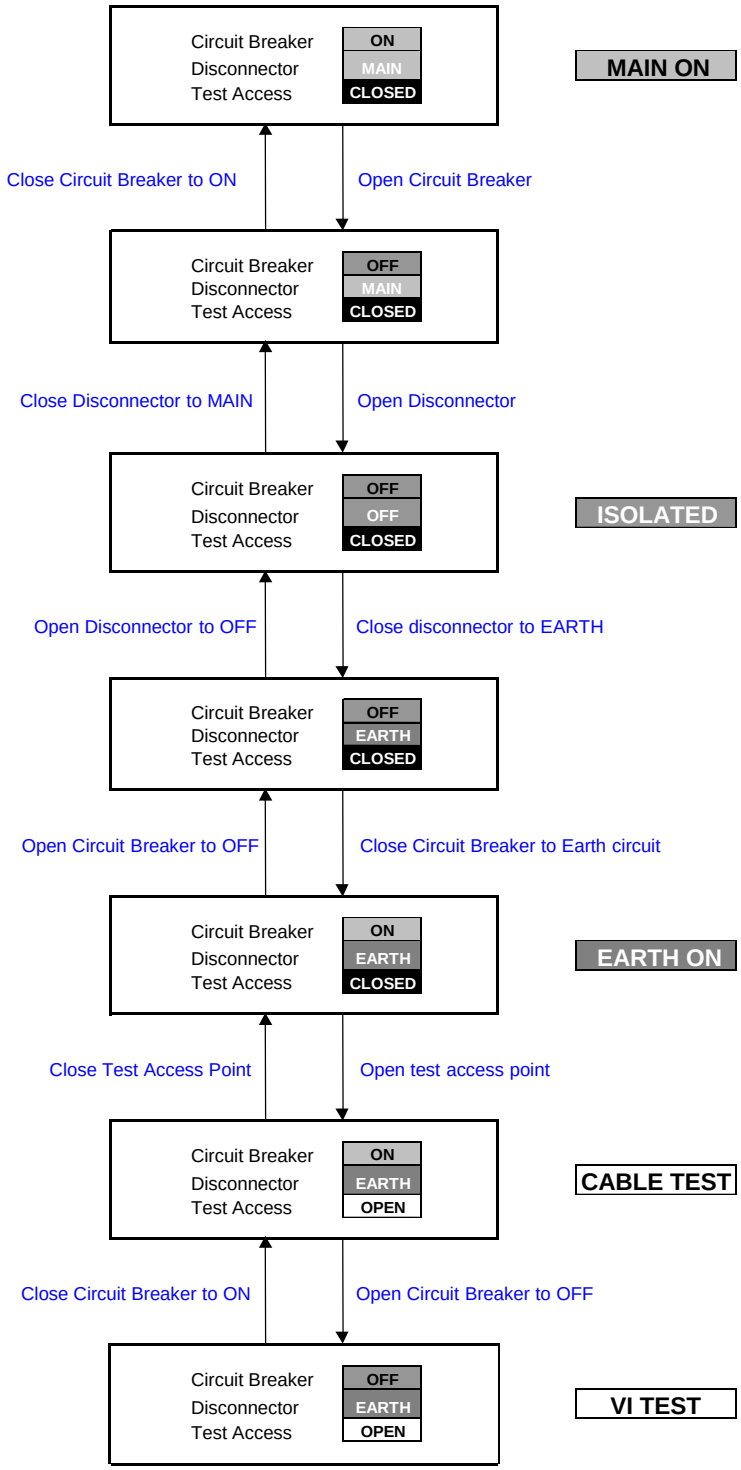
An interlock prevents the circuit breaker from being closed if the series disconnector is part way between one of its three positions.

All load and fault current interruption is carried out by the vacuum circuit breaker.



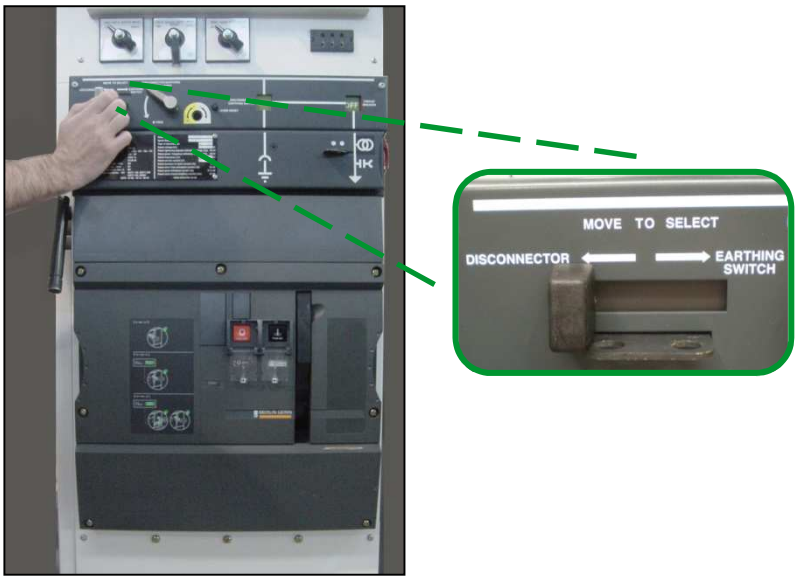
Operation map

This is an operation map showing the position of the panel and the process required to get to the next stage. Each step of the operation is interlocked to ensure that the equipment can only operate in accordance with the procedure below.



Operation of circuit beaker

Main On Position



Check the fascia diagram for the service condition. Remove padlocks if fitted. Move the selector to the disconnector position.

Move the disconnector lever down to the free position.

Insert the operating handle, found in the LHS end cover plate, and rotate clockwise until the selector resets in the locked position, and the disconnector is in the Main On position.

If the motorised mechanism has not been chosen the circuit breaker close springs can be charged via the integral multi stroke charging handle as indicated above

Close the vacuum circuit breaker to Main On by depressing the black manual close button. Clear plastic shields may be secured over the trip & close buttons, using padlocks to prevent unauthorised access.

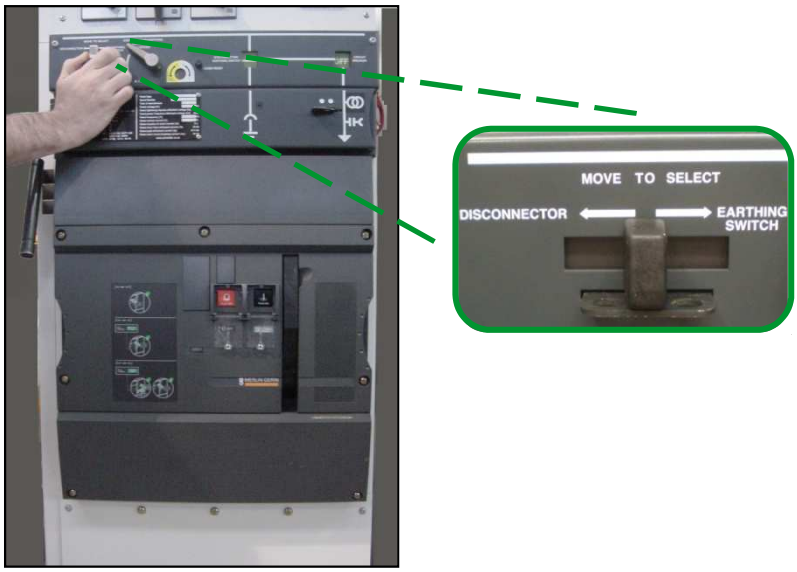
Operation of circuit beaker

Main Off Position

Check the fascia diagram for the service condition. Remove padlocks if fitted. Open the vacuum circuit breaker to the Off position by depressing the red manual trip push button.

Move the disconnector lever down to the free position.

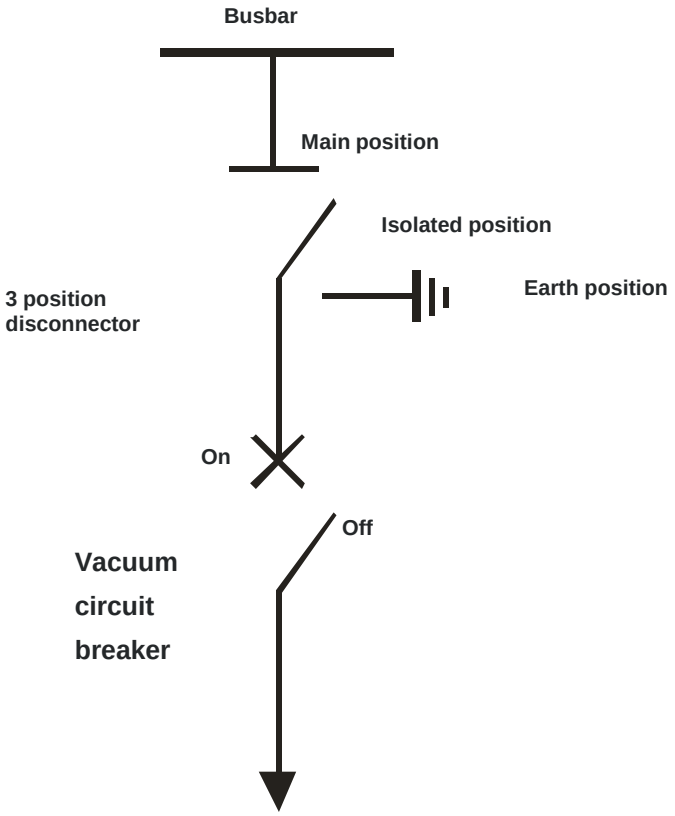
Insert the operating handle, found in the LHS end cover plate, and rotate anti-clockwise until the lever resets in the locked position, and the disconnector is in the Isolated position.



Move the selector to the centre position.

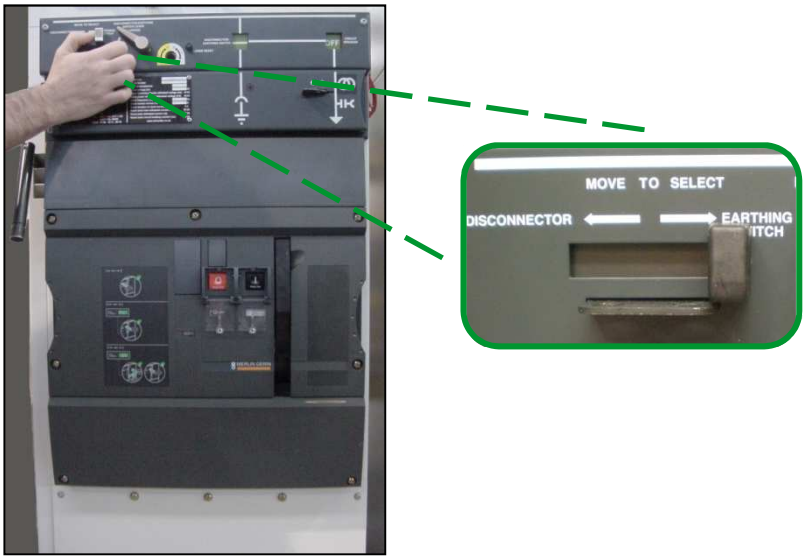
Circuit earthing

All circuit breaker panels have the ability to earth the circuit as standard. The circuit is earthed via the vacuum circuit breaker when the disconnector is in the Earth position. Being an off load device the circuit earth can only be selected with the circuit breaker is in the off position. Once the disconnector is in the earth select position the breaker can be closed earthing the circuit.



Operation of circuit beaker

Earth On Position



Check the fascia diagram for the service condition. Move the selector to the earth switch position.

Remove/Castells padlocks if fitted. Move the lever down to the free position.

Insert the operating handle, found in the LHS end cover plate, and rotate anti-clockwise until the lever resets in the locked position, and the disconnector is in the Earth Select position.

If the circuit breaker close springs are not already charged they can be via the integral multi stroke charging handle as indicated above

Close the vacuum circuit breaker to Main On by depressing the black manual close button as indicated above. The main MV circuit is now earthed.

Cable testing main cable

Ensure that the unit is in the Earth On position *see page 19*. This will allow the test access interlock to be moved

Remove padlock if fitted, move the test access interlock to the right and hold it in position, at the same time open the door using the hand recess. This operation will remove the earth star point and provide access to the testing bushings (marked with phase identification labels).

Insulated bushing shrouds can be withdrawn from the fascia to increase clearances between the bushings and earth.

Note: The disconnector cannot be operated with the test cover opened.

Reverse the procedure to return to the service condition.

Note: Always ensure the Test Access door is firmly pushed closed.

Warning: *ensure the cables are discharged to earth before touching the bushings before and after testing.*

Note: *If VT's are fitted to the panel then they must be isolated prior to cable testing (please refer to the VT fuse removal procedure on pages 33 & 34).*

Checking the Vacuum Integrity

Ensure that the unit is in the Earth On position *see page 19*. This will allow the test access to be moved

Remove padlock if fitted, move the test access latch handle to the right and hold it in position, at the same time open the door using the hand recess. This operation will remove the earth star point and provide access to the testing bushings (marked with phase identification labels).

Insulated bushing shrouds can be withdrawn from the fascia to increase clearances between the bushings and earth.

Note: The disconnector cannot be operated with the test cover opened.

To test the integrity of the vacuum bottles the circuit breaker can be opened with the test bushings accessed. The cable should be earthed at the remote end.

Once the circuit breaker is in the open position a test voltage (*see test voltage table on page 31*) is applied between each phase and the earth terminal in turn.

Upon completion of each test the exposed terminals must be discharged to earth using appropriate propriety equipment.

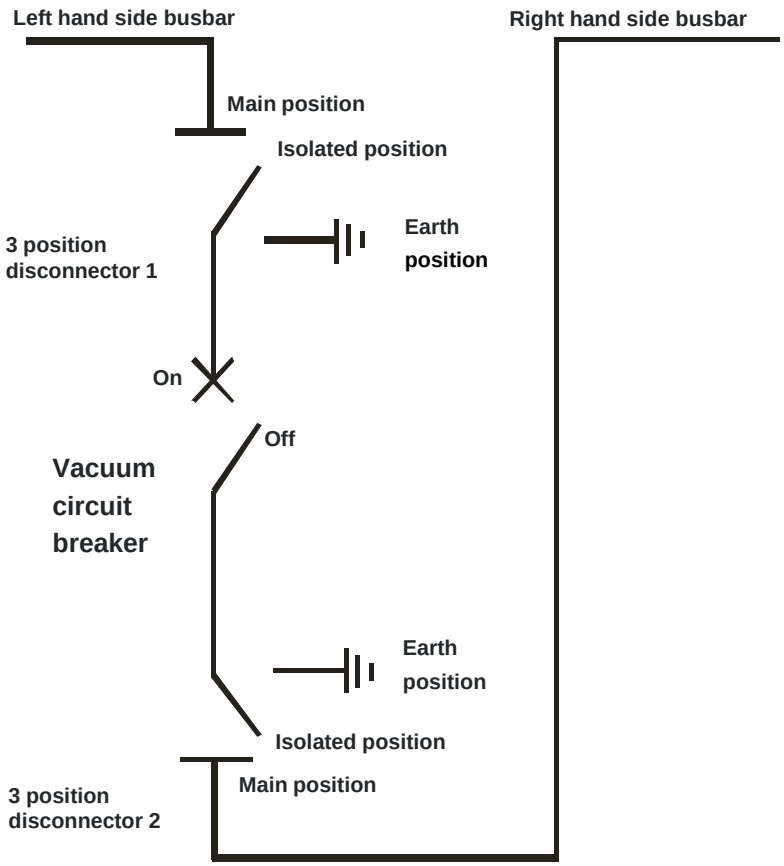
Reverse the procedure to return to the service condition.

Busbar earthing

The bus section panel has two series disconnectors utilised to offer either right hand or left hand side busbar earthing from the same panel, this eliminates the need for an additional busbar earth panel.

To earth the right hand side of the switchboards busbar, with the vacuum circuit breaker in the off position disconnector number two can be moved to the main select position and disconnector number one to the earth position.

When the circuit breaker is closed the right hand side of the switchboards busbar is earthed. The position of the two disconnectors is reversed to earth the left hand side of the switchboard busbar.



Operation of bus section

Earth Right hand side bars

Check the fascia diagram for the service condition. Remove padlocks if fitted. Move the upper (LHS) disconnector selector to the earth switch position.

Move the upper (LHS) lever down to the free position.

Insert the operating handle, found in the LHS end cover plate, and rotate anti-clockwise until the selector resets in the locked position, and the disconnector is in the Earth Select position.

Check the fascia diagram for the service condition. Remove padlocks if fitted. Move the lower (RHS) disconnector selector to the disconnector position.

Move the lower (RHS) lever down to the free position.

Insert the operating handle and rotate clockwise until the selector resets in the locked position, and the disconnector is in the Main On position.

If the circuit breaker close springs are not already charged they can be via the integral multi stroke charging handle as indicated above

Close the vacuum circuit breaker to Main On by depressing the black manual close button as indicated above. The RHS busbars are now earthed.

Operation of bus section

Earth Left hand side bars

Check the fascia diagram for the service condition. Remove padlocks if fitted. Move the upper (LHS) disconnector selector to the disconnector position.

Move the upper (LHS) lever down to the free position.

Insert the operating handle, found in the LHS end cover plate, and rotate clockwise until the selector resets in the locked position, and the disconnector is in the Main On position.

Check the fascia diagram for the service condition. Remove padlocks if fitted. Move the lower (RHS) disconnector selector to the earth switch position.

Move the lower (RHS) lever down to the free position.

Insert the operating handle and rotate anti-clockwise until the selector resets in the locked position, and the disconnector is in the Earth Select position.

If the circuit breaker close springs are not already charged they can be via the integral multi stroke charging handle as indicated above

Close the vacuum circuit breaker to Main On by depressing the black manual close button as indicated above. The LHS busbars are now earthed.

To test the dielectric withstand of each individual phase, perform a power frequency test, applying 20kV AC (50 or 60Hz) or 25kVDC from a high voltage test set across the open vacuum interrupter. A healthy vacuum interrupter shall withstand this applied test voltage.

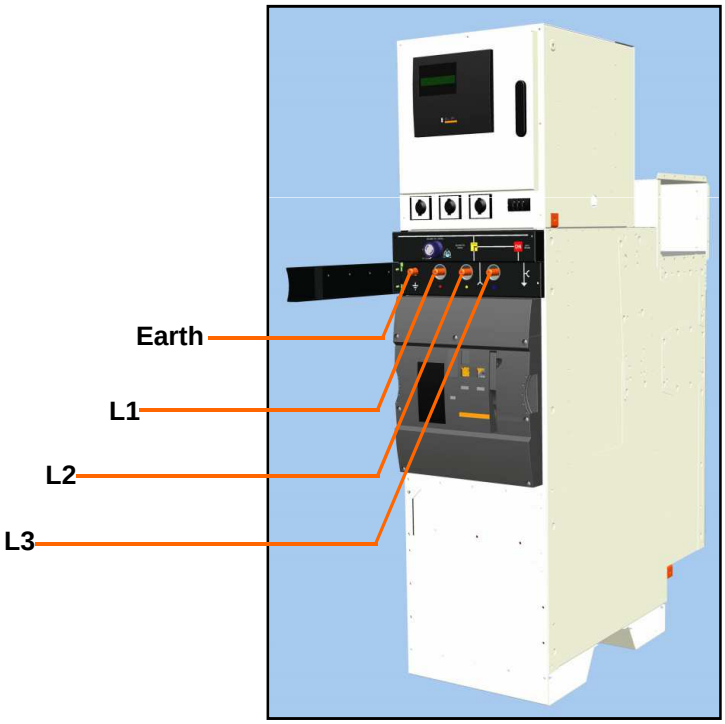
The adjacent tables detail the test voltage and connection points.

test voltage

Rated voltage voltage	AC test voltage (kV)	Frequency (Hz)	Duration (seconds)	(d.c test voltage)
13.8kV	20kV	50/60Hz	10s	25kV

test connection - circuit breaker

Test Phase	CB	Live terminal	Earthed terminal
L1 - Red	Open	L1	Earth / Frame
L2 - Yellow	Open	L2	Earth / Frame
L3 - Blue	Open	L3	Earth / Frame



Warning: *During the test X-rays will be emitted from the vacuum bottles. GenieEvo has a 3mm thick steel plate, which offers significant protection from this radiation, however it is recommended that all personnel should keep a minimum of 2m from the unit during test.*

Note: *If VT's are fitted to the panel then they must be isolated prior to testing (please refer to the VT isolation procedure on pages 33 & 34).*

Note: *Cable is earthed*

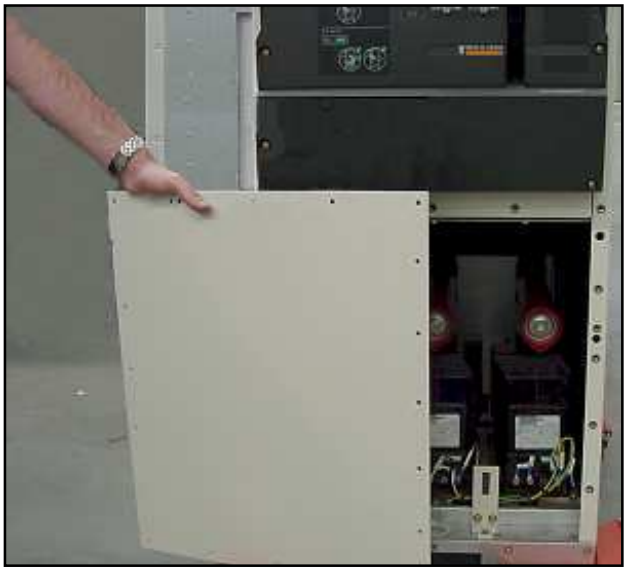
Lever reset

In the event of an inadvertent operation of the lever rather than having to operate the disconnector to an unwanted position and back again, the lever reset button can be used to reset the lever to the locked position as long as the disconnector has not commenced any operation.

Accessing VT's - standard arrangement

important note: before accessing VT's (during commissioning or replacing fuses) ensure that the panel is in the earth on position. If the unit is a bus-section ensure that the unit is earthed on the side of the busbars where the VT's are connected.
See pages **23, 27, 28, 29 & 30** for further details.

Remove the lower circuit breaker front cover access panel for access to the cast resin MV fuse carrier.



Warning: Isolate VT secondary circuit prior to this operation

Accessing/removing VT fuses - standard arrangement

Ensure that the panel is in the earth on position before removing the cover

With the lower VT chamber front cover access plate removed the three VT's can be isolated via the removal of the fuse.
Remove the dust cap and utilising an Allen key unscrew in an anticlockwise direction the fuse cap and withdraw the fuse.

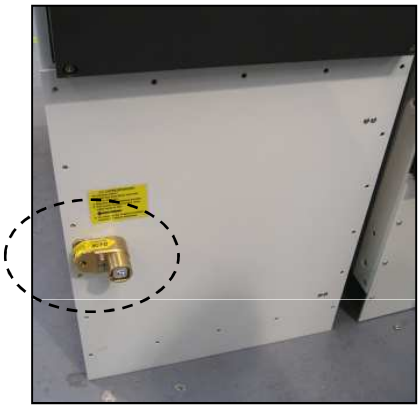
To re-connect the VT's the above procedure should be reversed remembering to **ensure that the unit is in the earth on position.**

Accessing VT's - interlocked arrangement

important note: before accessing VT's (during commissioning, replacing fuses or for isolation during cable testing) ensure that the panel is padlocked in the main earth on position. If the unit is a bus-section ensure that the busbars where the VTs are connected are earthed or completely isolated.
See pages **23, 27, 28, 29 & 30** for further details.

Remove padlock if fitted.
Remove the VT chamber front cover to access the VT fuses.

Turn key anti-clockwise to release



Insert key in to lower cover

Turn key clockwise and remove cover

Warning: *Isolate VT secondary circuit prior to this operation.*

Accessing/removing VT fuses- interlocked arrangement

Ensure that the panel is in the earth position

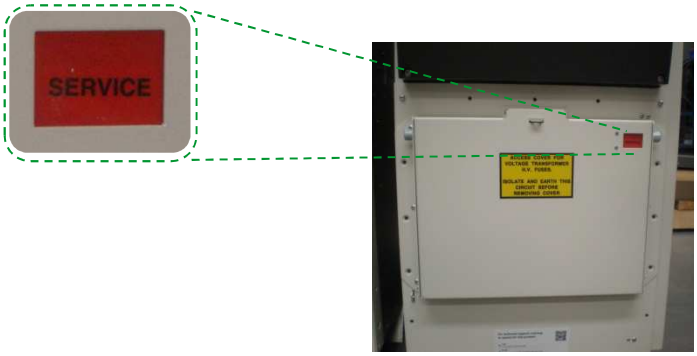
With the lower VT chamber front cover access plate removed the three VT's can be isolated via the removal of the MV fuse.
Remove the dust cap and utilising an Allen key unscrew in an anticlockwise direction the fuse cap and withdraw the fuse.

To re-connect the VT's the above procedure should be reversed remembering to **ensure that the unit is in the earth on position before removing the cover.**

Accessing withdrawble VT fuses

important note: before accessing VT's (during commissioning or replacing fuses) ensure that the panel is in the earth on position before removing the cover. If the unit is a bus-section ensure that the unit is earthed or completely isolated.
See pages **23, 27, 28, 29 & 30** for further details.

Remove padlock if fitted to the lower circuit breaker front cover access panel.



Isolation of withdrawable VT fuses

Ensure that the panel is in the earth position

The spring loaded VT fuse shutter is lowered to access the three phase fuse carrier.

VT's can be isolated via the horizontal withdrawal fuse carrier.

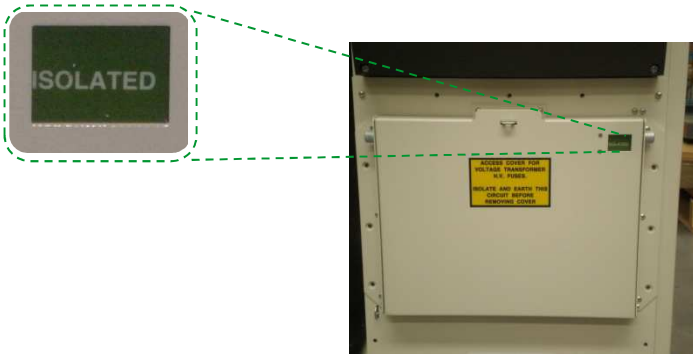
The initial movement of the fuse carrier isolates the secondary VT circuit prior to breaking the MV connection.

Replacing VT fuses

The spring loaded VT fuse shutter will close automatically.

Indication of VT isolation is displayed as shown.

To re-connect the VT's the isolation procedure (see pages 33 &34) should be reversed remembering to **ensure that the unit is in the earth on position.**



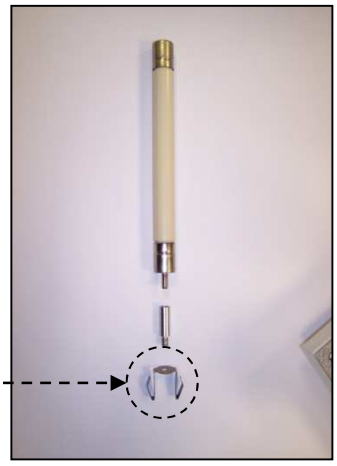
Replacing VT Fuses

The VT fuses are fitted to the fuse carrier via a screw fixing.

The fuses are removed by simply unscrewing the fuse from the insert within in the individual resin end cap.

Before replacing VT fuses check continuity.

To replace the MV fuse the above procedure should be reversed remembering to **ensure that the contact spring clip is fitted as shown.**



Phase live indication

Each panel has a circuit voltage presence indication system VPIS in accordance with IEC 61958.

Each phase has a permanently illuminated LED lamp. This device provides an indication but **should not be used as evidence that the unit is dead**.

The bus section panel has phase live indication for both the RHS and LHS busbars. As well as indicating live busbars these can be used for phase comparison purposes between the two incoming supplies.

Important: *this must not be used to confirm the circuit is dead.*

Note: *kit reference GEN-A25 phase sequence indicator.*

Use IEC 61298 type comparator

If a switchboard is being extended then all VPIS modules will need to be identical types. Phase testing using either a Phisterer or phase concordance unit can only be done on identical VPIS blocks.

Commissioning

All equipment is subject to stringent quality and operational checks prior to despatch, however it is the owners responsibility to ensure that commissioning tests have been completed to IEC62271-1. The following is a resume of these tests.

physical checks

Remove all packaging and transit labels from the equipment. Check the data plate details against the specification.

functional checks

Check the operation of the circuit breaker, test access and various interlocks.

Check operation of auxiliary switch contacts and remote indication in accordance with the schematic diagram. Confirm the phase relationship of the neon indicator sockets.

Check the pick up voltage of auxiliary coils if fitted. Closing coils should operate between 85% and 110% of the rated voltage. Opening coils should operate between 70% and 110% of the rated voltage.

note: *all voltages should be applied instantaneously unless otherwise specified.*

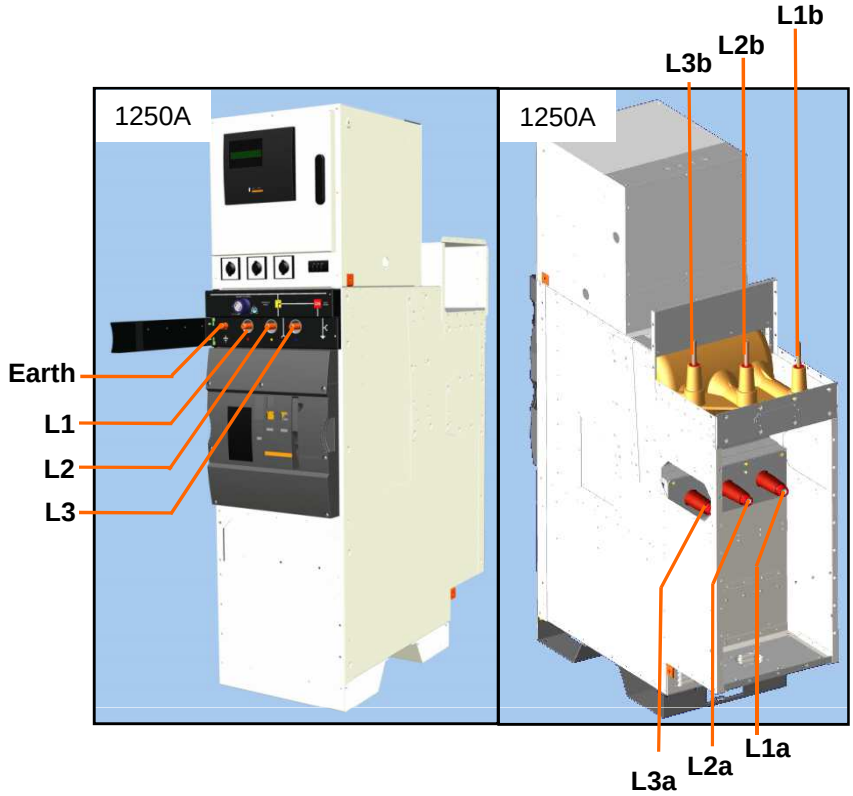
protection and control system

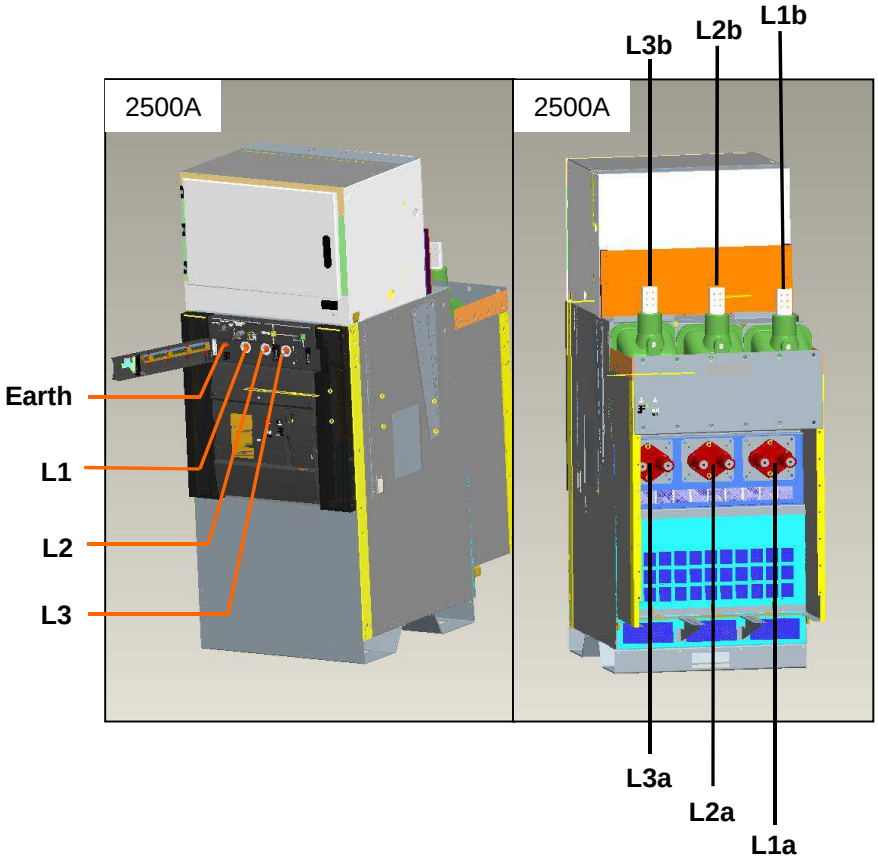
Refer to Sepam commissioning guide or relay manufacturer's data.

high voltage withstand test to IEC62271-1

Connect the H. V. test set and carry out the withstand tests in accordance with the following tables.

note: *ensure VT's are disconnected prior to carrying out any HV pressure tests.*





test voltages

Rated voltage	AC test voltage (kV)	Frequency (Hz)	Duration (minutes)	DC test voltage (kV) - (current practice)
3.6kV	8kV	50Hz	1 (AC) 15 (DC)	7.5kV
7.2kV	16kV	50Hz	1 (AC) 15 (DC)	15kV
12kV	23kV	50Hz	1 (AC) 15 (DC)	25kV
13.8kV	32kV	50Hz	1 (AC) 15 (DC)	32kV

test connection - circuit breaker

Test number	CB / Switch	Live terminals	Earthed terminals
1	closed	L1, L2, L3	frame
2	closed	L1, L2	L3, frame
3	closed	L2, L3	L1, frame
4	closed	L3, L1	L2, frame
5	open	L1a, L2a, L3a	L1b, L2b, L3b, frame
6	open	L1b, L2b, L3b	L1a, L2a, L3a, frame

note: *ensure VT's are disconnected prior to carrying out any HV pressure tests*

The following tests should also be carried out. If additional information and/or assistance is required please consult us.

- primary injection
- secondary injection
- CT spill test
- CT polarity test
- relay secondary injection
- relay timing and functionality tests
- integrity check of vacuum interrupter
- Main – earth circuit resistance

routine maintenance recommendations to BS6626:1985

Routine maintenance will depend on the conditions to which the unit is subjected and to the relevant codes and practice. Periodic inspection of the substation and equipment will be necessary to establish the conditions to which the units are subjected to

	ideal conditions	standard conditions	aggressive conditions
Disconnector enclosure	no attention	no attention	no attention
mechanism	no attention	no attention	every 10 years
housing	no attention	every 10 years	every 5 years
vacuum bottle	every 10 years	every 10 years	every 10 years
protection system	every 10 years	every 10 years	every 10 years

Environmental conditions

ideal conditions

environmental conditions
Unit installed and commissioned in accordance with the manufacturers instructions
Indoors, completely protected from the weather.
Humidity below 40% and no dripping water.
Minimal dust and air circulation.
Ambient temperature between -5°C and +40°C.
No contact with any chemical agents (eg. salt).
No infestation of any animal life (eg. insects).
No contact with any plant life (eg. mould).
No earth movements.
No damage to the unit of any kind.

operational conditions
No mal-operation of any kind.
No abnormally high number of operations - refer to the graph.
No abnormally high number of faults - refer to the graph.
No over-voltage or over-current (above rating).

standard conditions

environmental conditions
Unit installed and commissioned in accordance with the manufacturer's conditions.
Humidity below 60%.
Unit may be indoors or outdoors within enclosures, but must not be subjected to regular extremes of weather eg. heavy rain storms, dust storms, heavy snow and ice, flooding, temperature cycles greater than 40°C or less than -5°C, dense coastal fog or acid rain.
No regular or thick covering of debris.
No contact with any chemical agents (eg. salt).
No infestation of animal or plant life.
No earth movements.
No damage to the unit of any kind.

operational conditions
No mal-operation of any kind.
No abnormally high number of operations - refer to the graph.
No abnormally high number of faults - refer to the graph.
No over-voltage or over-current (above rating).

aggressive conditions

Any environmental or operational conditions which do not satisfy either of the above two descriptions must be deemed aggressive.

note: *local legislation may dictate maintenance be carried out with greater frequency, irrespective of site conditions. Please contact your local Schneider Electric representative for further details.*

Substation maintenance

This maintenance recommendation is based on best practices to ensure safe operation of the substation and the switchgear contained within it. Normally it will not be necessary to replace any parts or perform any lubrication during maintenance because of the fixed pattern virtually maintenance free design of GenieEvo. The following recommendations are intended to be a means of assessing the health of the switchgear to ensure it will give continued reliable service. All relevant safety procedures should be followed.

Minor maintenance on a 6-12 month period

The minor maintenance check is intended to ensure that the switchgear is not under threat from the environment in which it is installed. It is intended that the minor maintenance check can be performed with the switchboard live although care must be taken only to work on accessible sides while the equipment is live.

Perform a minor maintenance inspection to ensure that:

- the substation has not been attacked by vandals
- the substation is not overgrown with vegetation
- the substation locks are secure
- the substation is dry and free from leaks
- the earth circuit is still connected
- with an ultrasonic/tev discharge detector listen to the switchgear enclosure to ensure that it is free from partial discharges. Pay particular attention to cable boxes and busbar chambers
- cable box covers are correctly secured and sealed
- doors and covers are correctly closed and sealed
- check that the enclosure is free from corrosion
- check that the protection relay is powered up and not showing any errors
- replace any missing fixings from the external enclosure

If problems are encountered during minor maintenance it may be necessary to perform major maintenance.

Major maintenance on a 5-10 year period

The major maintenance check is intended to assess the health of the circuit breaker to ensure all main functions are operating correctly.

Disconnector mechanism

- operate to ensure that they are free to move correctly
- check interlocks operate correctly

If the above operational checks reveal problems or if the equipment is installed in a particularly corrosive or dusty environment then the following steps may also be required:

With the unit fully isolated:

- remove the disconnector mechanism cover and with a vacuum cleaner remove any excess dust/debris
- if the mechanism has been contaminated with dust and sand clean the mechanism to remove all visible contamination and re-lubricate affected area
- inspect components for signs of corrosion
- Always ensure that any panels and covers are correctly replaced after maintenance is completed.

Circuit breaker mechanisms

- operate to ensure that they are free to move correctly
- check interlocks operate correctly

If the above operational checks reveal problems or if the equipment is installed in a particularly corrosive or dusty environment then the following steps may also be required:

- remove the Evolis circuit breaker mechanism cover and with a vacuum cleaner remove any excess dust/debris
- if the mechanism has been contaminated with dust and sand clean the mechanism to remove all visible contamination and re-lubricate affected area
- inspect components for signs of corrosion
- Always ensure that any panels and covers are correctly replaced after maintenance is completed.

Protection System

- check that the protection settings are correct on the relay
- perform a primary or secondary current injection test to prove that the protection circuit is OK and that the tripping mechanism is OK. (Primary injection is the preferred method as it proves the CT's as well, but it will need the cables removing so may be inconvenient)
- check with Schneider Electric Ltd for the recommended life expectancy of the protection relay if the relay is more than 20 years old, it may require replacing before the next maintenance interval. Contact Schneider Electric on the numbers given at the end of this section.

VPIS

- before the switchgear is isolated ensure that all three phases are indicating correctly
- the life expectancy of a VPIS device is between 10 & 20 years, if the maintenance period is 10 years then the VPIS device should be replaced at each major maintenance interval.
- Contact Schneider Electric on the numbers given at the end of this section..

Voltage Transformer

- before de-energising the switchboard measure the secondary voltage of the VTs.
- check continuity of VT fuses.
- for unscreened VTs clean down the external surface of the insulation with Isopropanol and lint free cloths to remove any excess dust/debris.
- check the external surface for signs of partial discharges.
- Always ensure that any panels and covers are correctly replaced after maintenance is completed.

Ring type CTs

- no inspection necessary

Cable boxes

- perform a visual inspection of the cable termination, looking in particular for signs of partial discharges, black or white surface contamination or over heating.
- with Isopropanol alcohol and a lint free cloth clean down the surface of the cable termination to remove any contamination from the surface.
- with a vacuum cleaner remove any excess dust from inside the box then wipe down the inside surface of the box with Isopropanol alcohol.
- ensure all seals and fixings are present.
- ensure cable earth is securely connected back to the switchgear's main earth bar.

Busbar Chamber

- perform a visual inspection of the busbars and busbar boots, looking in particular for signs of mechanical damage, partial discharges or over heating.
- ensure that the busbar is assembled correctly and correctly torqued.
- with Isopropanol alcohol and a lint free cloth clean down the surface of the busbars and the insulated busbar boots to remove any contamination from the surface.
- with a vacuum cleaner remove any excess dust from inside the busbar chamber then wipe down the inside surface of the chamber with Isopropanol alcohol.
- ensure all seals and fixings are present.

Vacuum circuit breakers

- perform a resistance test across the closed circuit breaker contacts
- perform either a 20kV AC or 25kV DC pressure test across the open contacts.

Cable test points and Earth circuits

- open the cable test points and ensure that the moving earth bars and the fixed contacts are fixed securely, clean, free of corrosion and that the contact surfaces are lubricated.
- perform a resistance/continuity test from the switchgears main earth bar back to the substations main earth point.

If equipment is removed from service, before it is re-used perform the following tests

- Main and Earth circuit resistance
- Power frequency
- Protection system
- Full mechanical test/checks

Maintenance

general operation

For circuit breaker panels check the electrical protection system.

Check the operation of the unit and all mechanical interlocks.

housing

Check all external fixings, labels and earth connections are present and tight.

Check inside the MV cable box, busbar system LV cabinet and pilot cable box for heavy deposits of dust, ingress of
water or contamination by animal or plant life.

Clean the units thoroughly and touch up paint work as necessary.

De-mounting

It is possible to de-mount the circuit breaker from the housing without breaking down the switchboard arrangement.

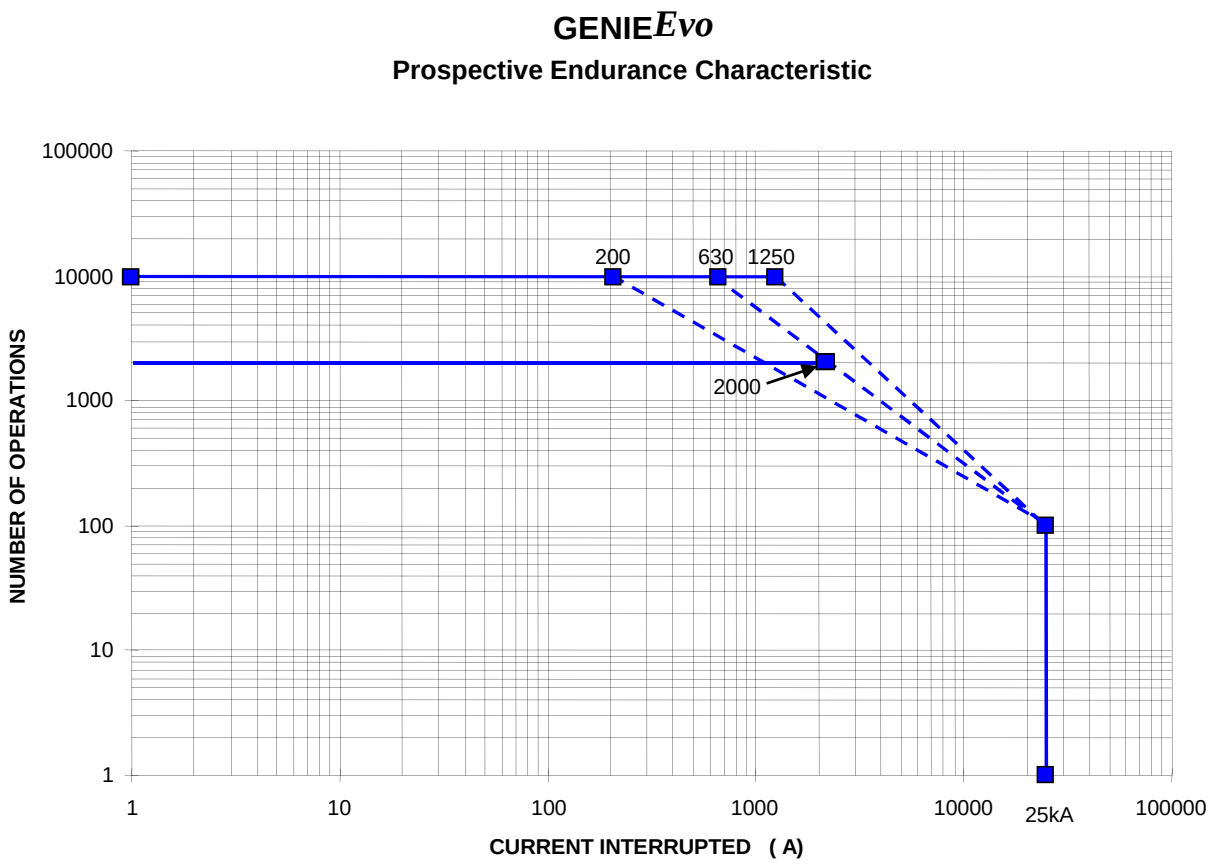
A separate method statement and video detailing the procedure involved is available from Schneider Electric. Please contact us for further details on the numbers provided at the end of this section.

Expected life

We can confirm that the life expectancy of Genie*Evo*, if correctly maintained, shall be 25 years minimum.

Mechanism

In the unlikely event of a mechanism failure, please contact Schneider Services (details on page 45).



After sales support customer services for products within warranty

For technical support on current products please contact our customer services department:

Tel: +44 (0) 13 290 3651

Fax: +44 (0)113 290 3710

Email: GB-MV-CustomerServices@schneider-electric.com

Out of hours telephone technical support

Tel: 0870 608 8 608

This service is available between 5pm and 8am, weekdays, all days weekends and national holidays

Field Services for products outside warranty

For the following services please contact Field Services:

- Spares and managed spares contracts
- Maintenance and service contracts
- Retrofit
- Installation
- Testing and commissioning
- System design
- Training

Tel: +44 (0)1925 845 999 / 0870 608 8 608

Email: fs.support@schneider-electric.com

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Schneider Electric is leading the Digital Transformation of Energy Management and Automation in Homes, Buildings, Data Centers, Infrastructure and Industries.

With global presence in over 100 countries, Schneider is the undisputable leader in Power Management – Medium Voltage, Low Voltage and Secure Power, and in Automation Systems. We provide integrated efficiency solutions, combining energy, automation and software.

In our global Ecosystem, we collaborate with the largest Partner, Integrator and Developer Community on our Open Platform to deliver real-time control and operational efficiency.

We believe that great people and partners make Schneider a great company and that our commitment to Innovation, Diversity and Sustainability ensures that Life Is On everywhere, for everyone and at every moment. **www.schneider-electric.com**

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