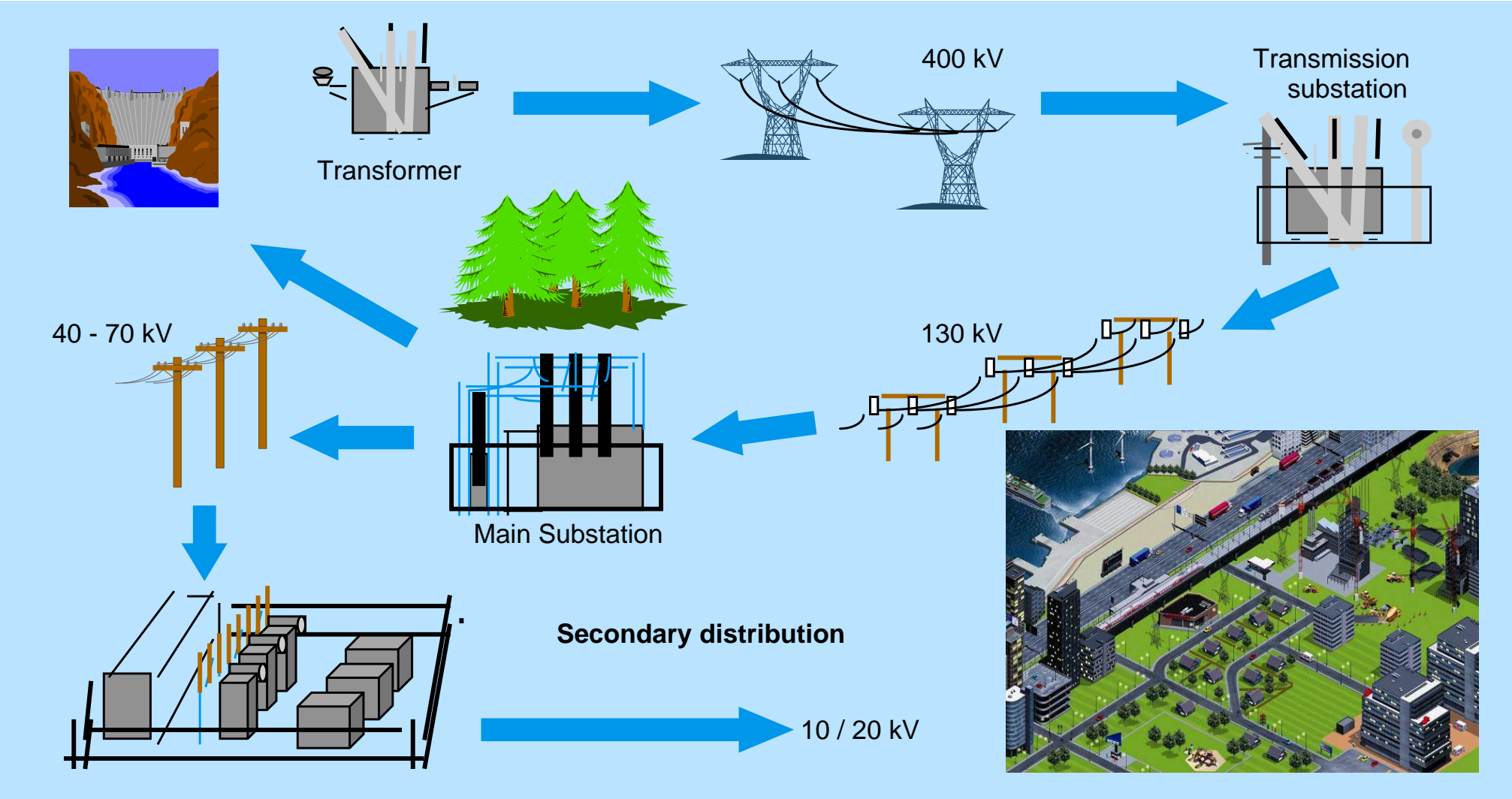


SF₆ gas insulated RMU – SafePlus 24 kV

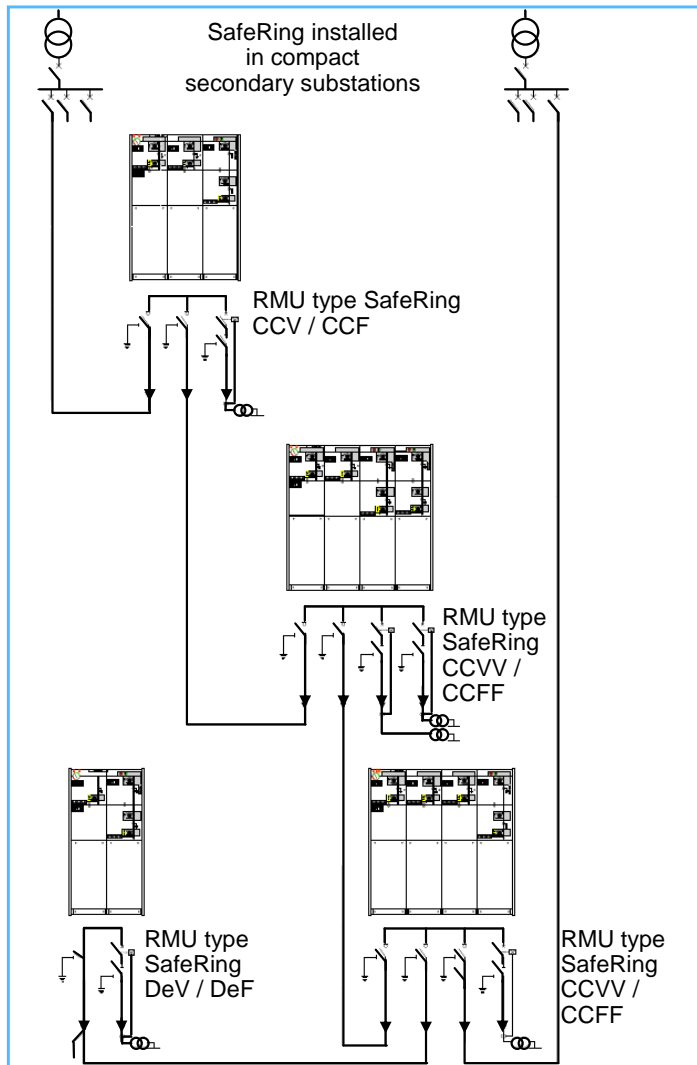
SF₆ gas insulated RMU – SafePlus

Secondary distribution



SF₆ gas insulated RMU – SafePlus

Installed within secondary distribution network



Can be applied where

- compact,
- flexible
- and economic solutions are required

SF₆ gas insulated RMU – SafePlus Applications



- Compact secondary substation
- Wind power plants
- Small industries
- Buildings
- Mining
- Airports
- Underground installations

SF₆ gas insulated RMU – SafePlus Applications

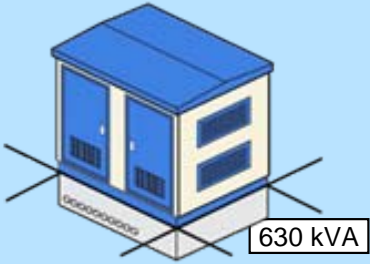
Buildings



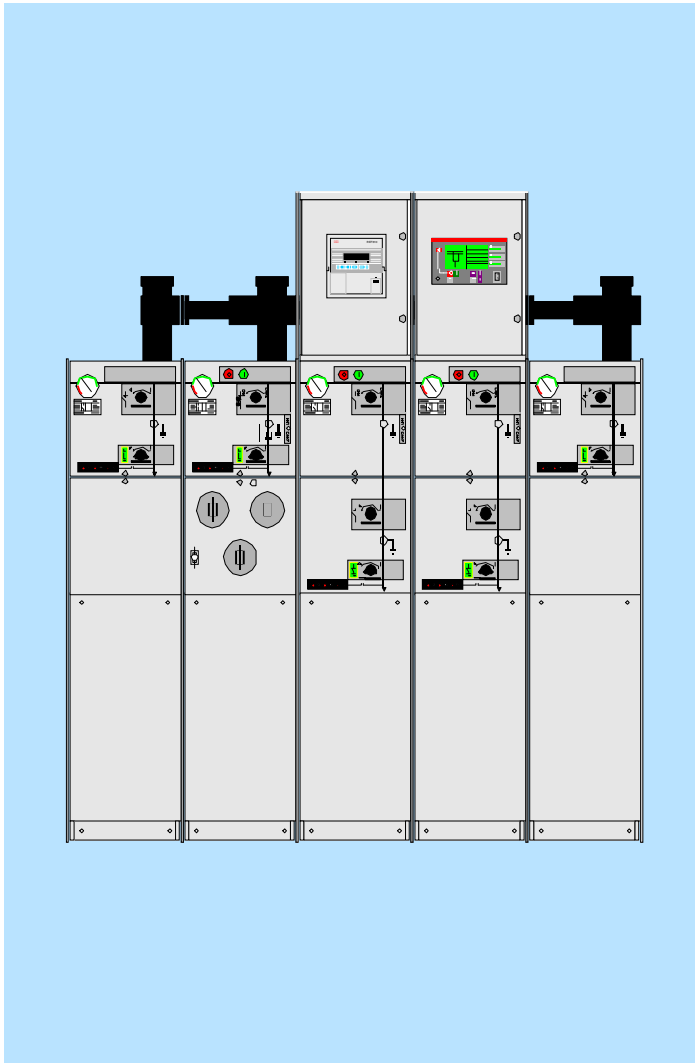
Wind Power Plants



Compact secondary substation

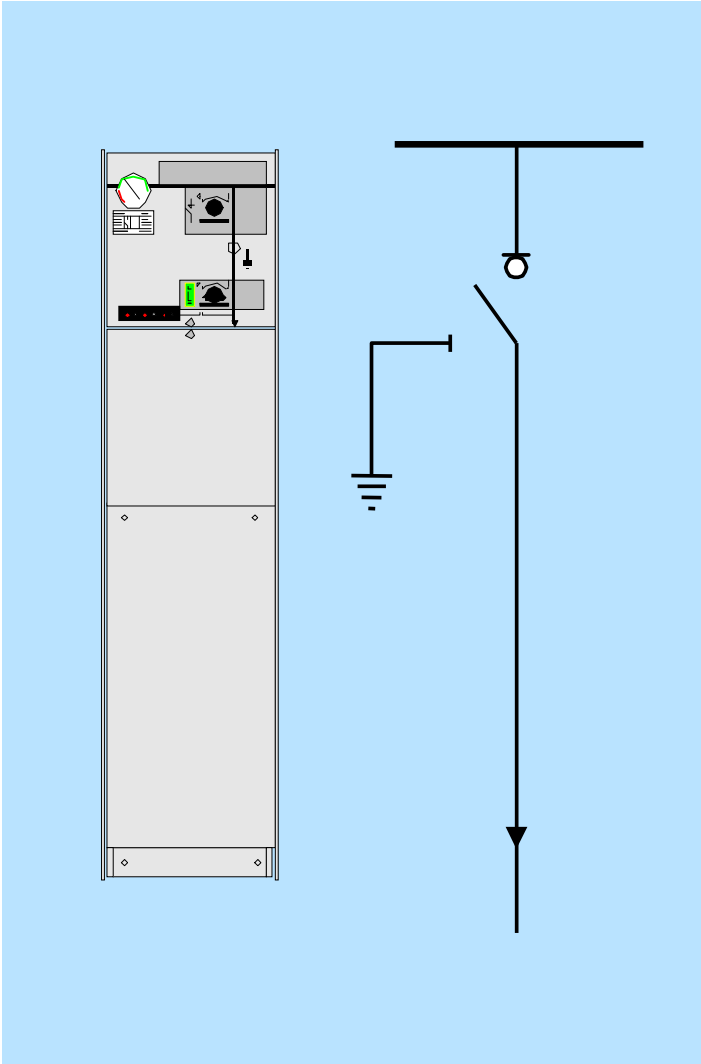


SF₆ gas insulated RMU – SafePlus Modules



- C - Load Break Switch
- F - Load-Break-Switch-fuse combination
- V - Vacuum circuit-breaker
- CB - VD4 vacuum circuit-breaker
- SI - Sectionalizer (LTS)
- Sv - Sectionalizer (Vacuum circuit-breaker)
- D - Direct cable connection
- De - ~ with earth switch
- Be - Busbar earth
- M - Metering

SF₆ gas insulated RMU – SafePlus C – load break switch

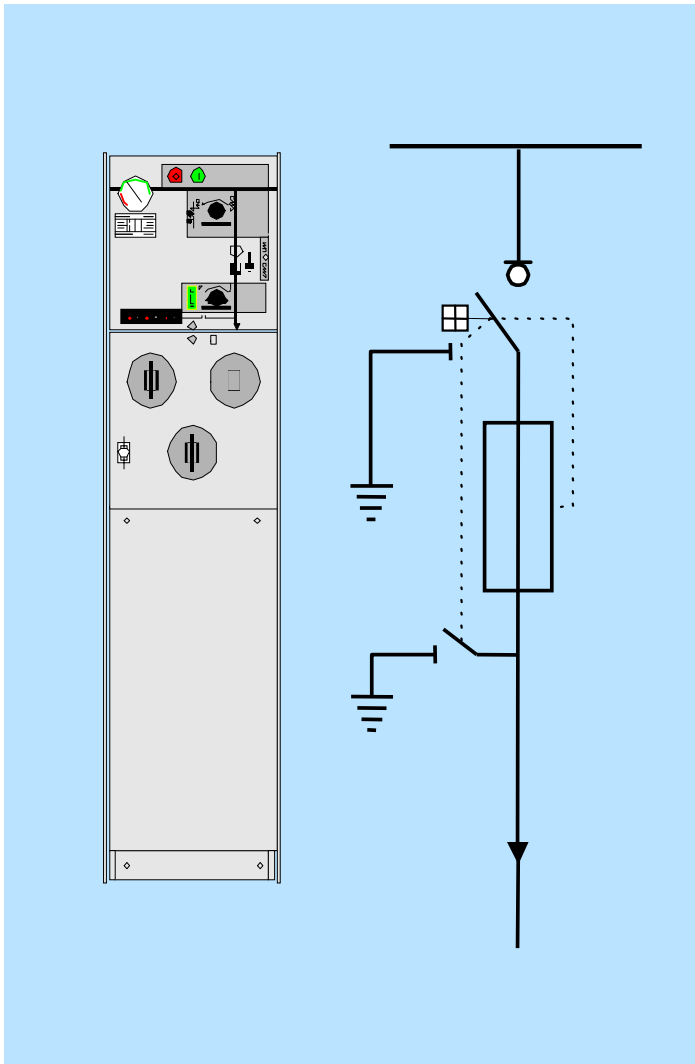


- Three-position-load-break switch
- Snap action or latched mechanism
- Cable test bushings in front available (option)

kV	12	24
A	630	630
kA	25 - 1s	21 - 3s
kA	21 - 3s	

SF₆ gas insulated RMU – SafePlus

F – load-break-switch-fuse combination

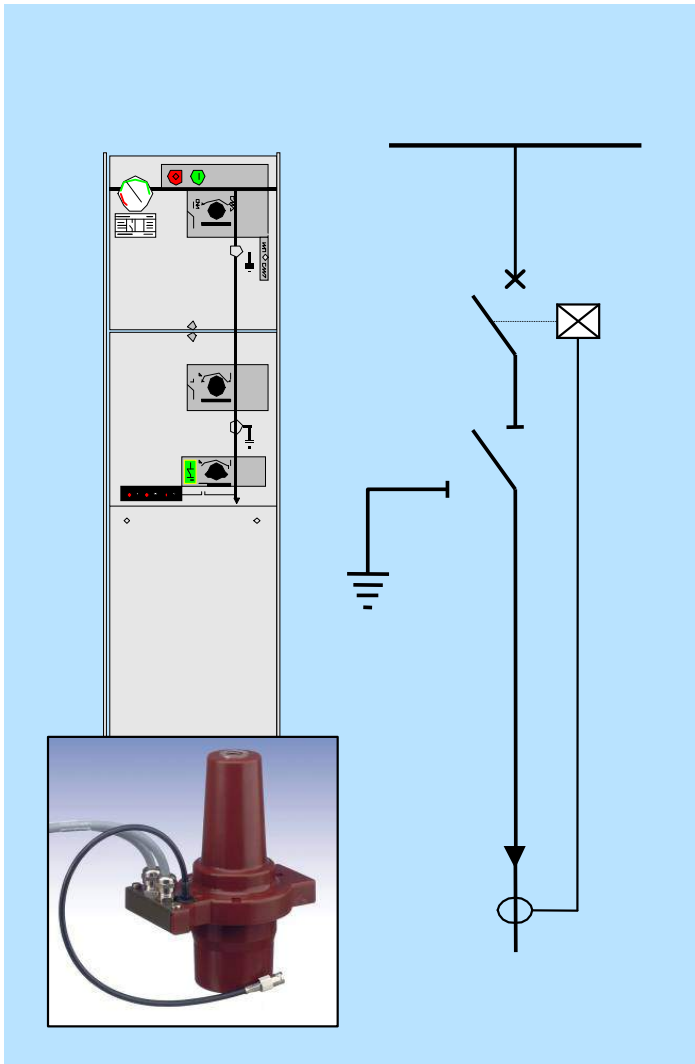


- Switch-fuse combination
- Three phase fuse tripping
- Mechanism pre-charged for tripping
- Up and downstream dual earthing switch
- No jammed fuse covers – open by handle
- Fuse tripping in front – real blown fuse indicator
- Fully submersible – unique for switch fuse
- 400 series cable bushings available

kV	12	24
A	200	200
kA	limited by fuse links	
Max fuse	125 A	63 A

SF₆ gas insulated RMU – SafePlus

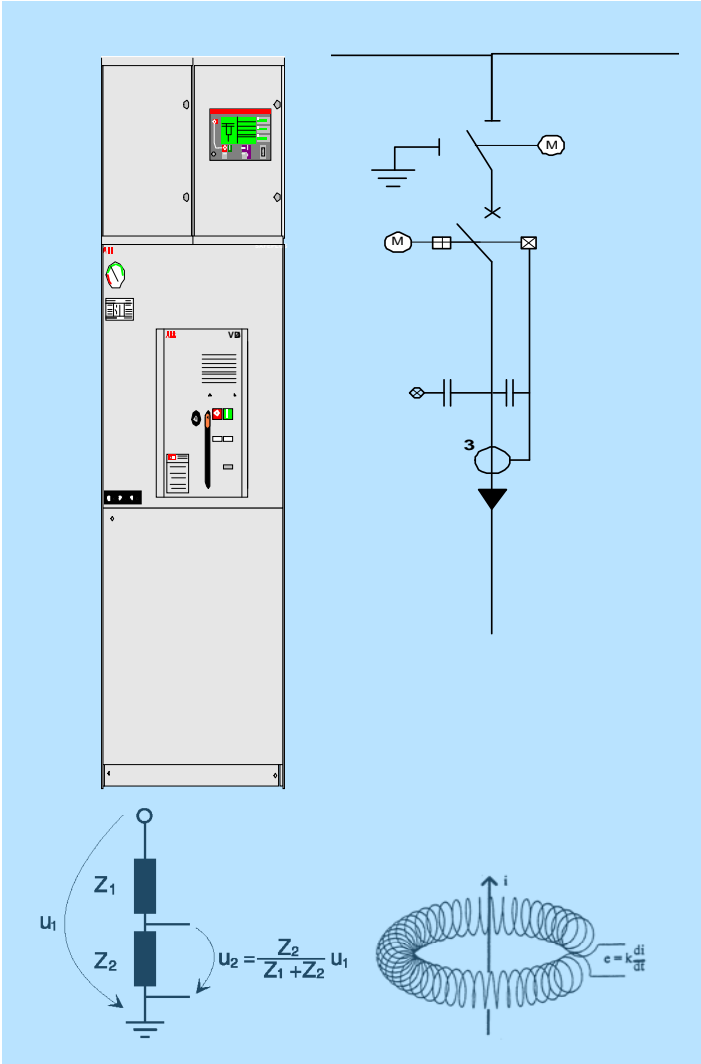
V – vacuum circuit-breaker



- 630 A or 200 A vacuum circuit-breaker
- Latched mechanism – close and open coil
- Separate isolator / earth switch
- Protection as specified by our customers
- Tripping facilitated for a wide range of relays
- Combi-sensor available

kV	12 (15)	24
A	200/630	200/630
kA	21 - 3s	16 - 3s

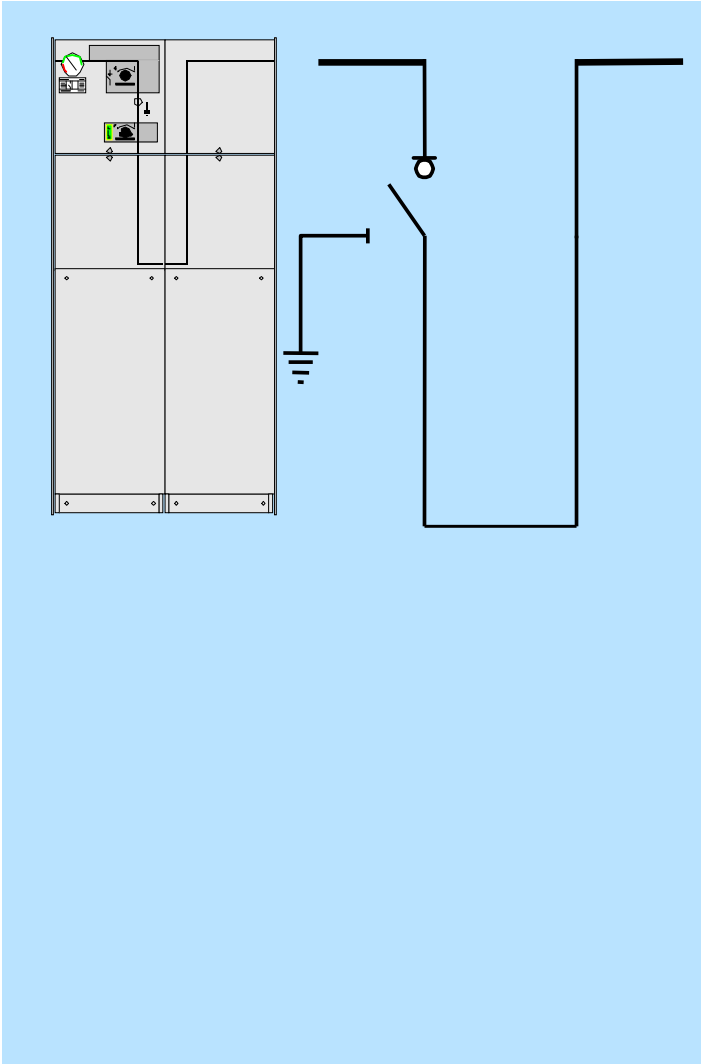
SF₆ gas insulated RMU – SafePlus CB – VD4 vacuum circuit-breaker



- 630 A or 1250 A VD4 vacuum circuit-breaker
- Interlocked disconnector / earth switch
- Current and voltage sensor techniques
- REF control and protection unit
- Motor operated circuit-breaker and
- Disconnector / earth switch

kV	12	24
A	630/1250	630/1250
kA	25 - 1s	20 - 3s
kA	20 - 3s	

SF₆ gas insulated RMU – SafePlus SI – busbar sectionalizer

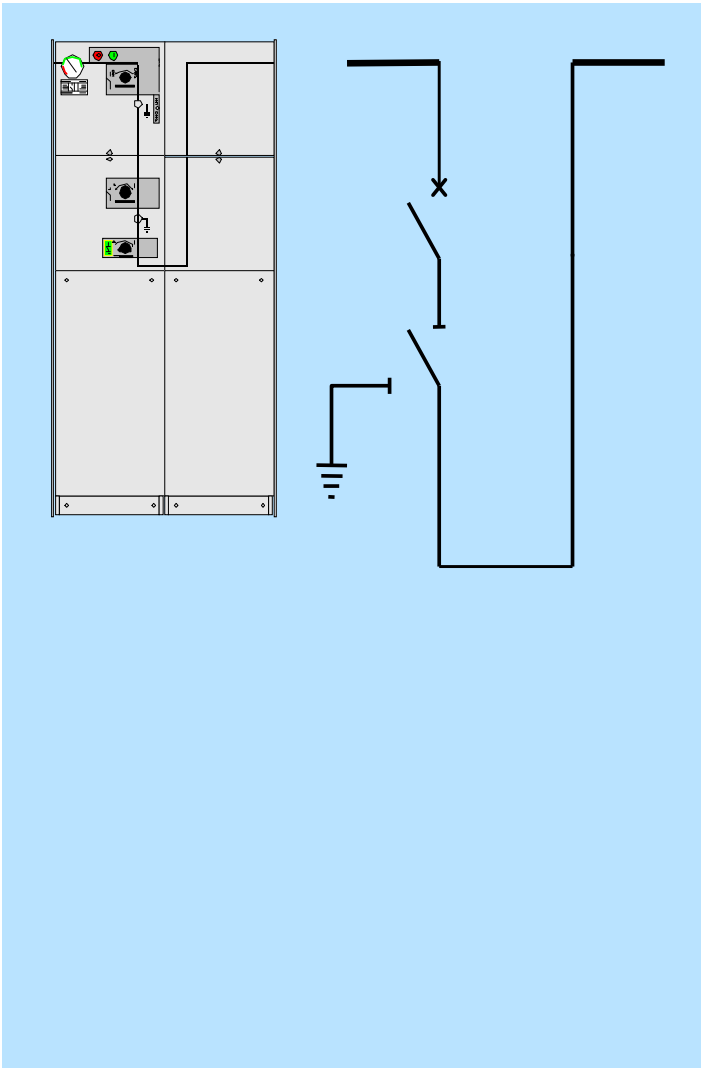


- Three position load break switch
- Interlocked earth switch
- Manual or motor operation
- Only 325 mm wide when placed between other modules

kV	12	24
A	630	630
kA	25 - 1s	21 - 3s
kA	21 - 3s	

SF₆ gas insulated RMU – SafePlus

Sv – Busbar sectionalizer (vacuum circuit-breaker)



- 630 A vacuum circuit-breaker
- Separate isolator / earth switch

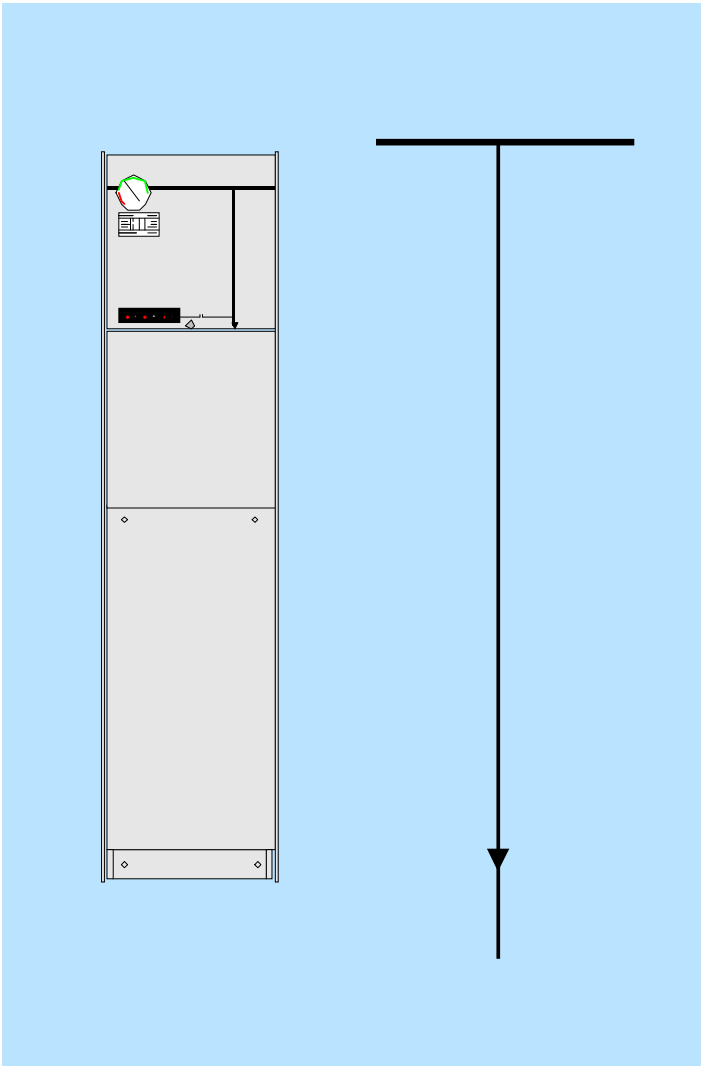
kV	12 (15)	24
A	630	630
kA	21 - 3s	16 - 3s



SF₆ gas insulated RMU – SafePlus

D – direct cable connection

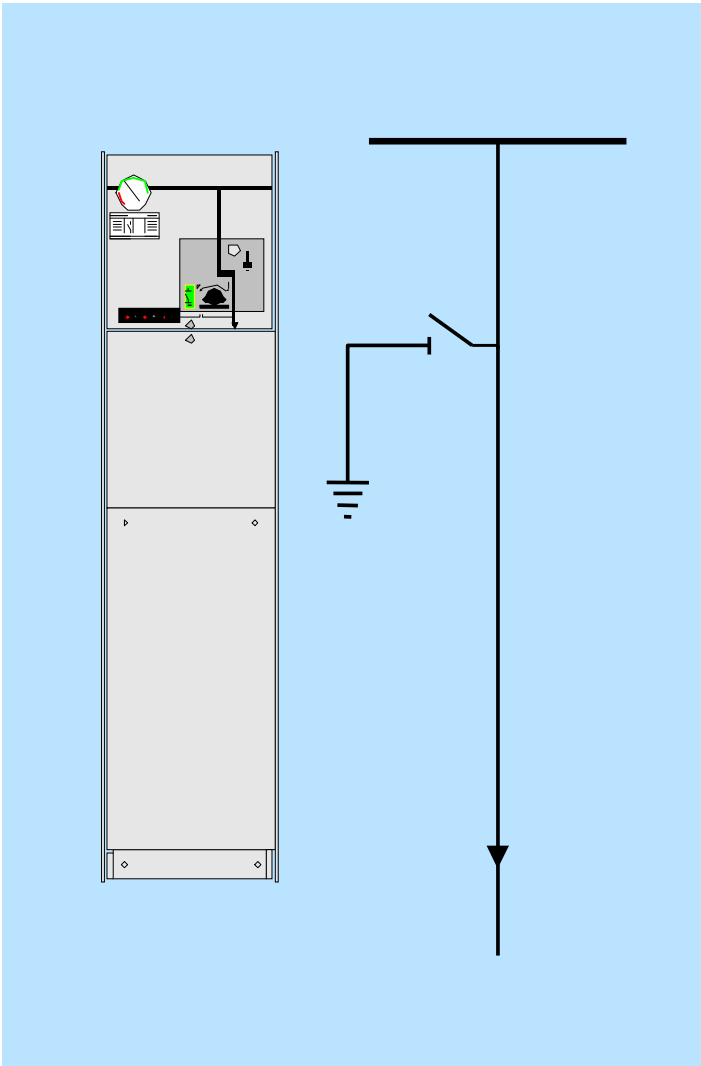
- Direct cable connection



kV	12	24
A	630	630
kA	25 - 1s	21 - 3s
kA	21 - 3s	

SF₆ gas insulated RMU – SafePlus

De – ~ with earth switch

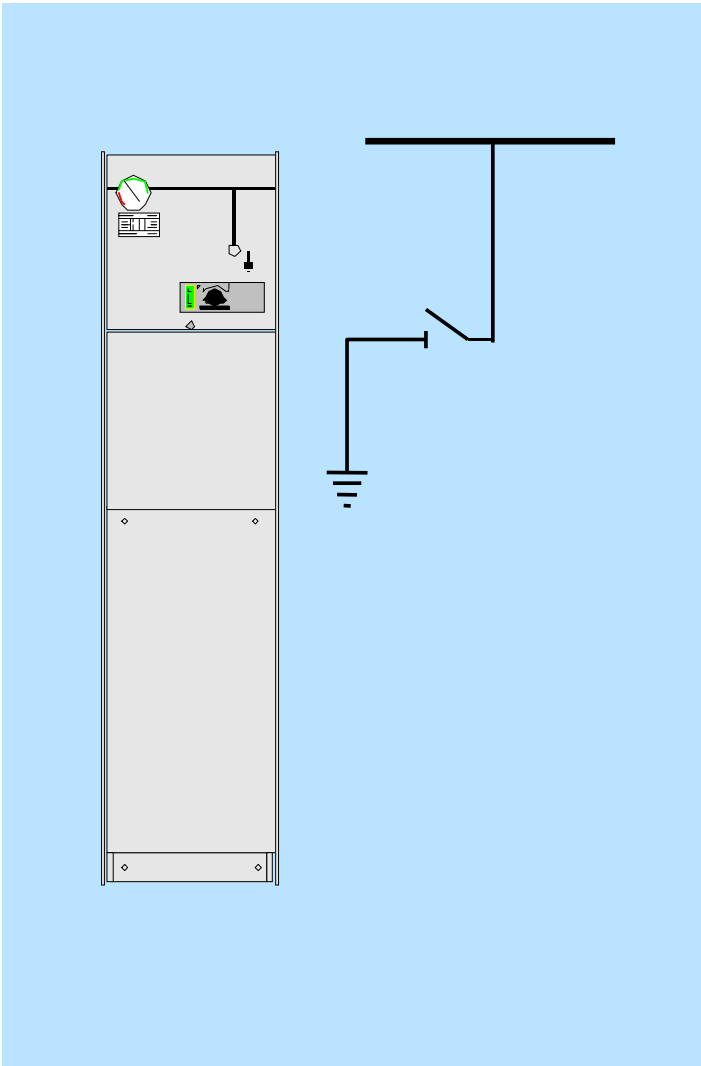


- Direct cable connection
- Earthing switch with making capacity

kV	12	24
A	630	630
kA	25 - 1s	21 - 3s
kA	21 - 3s	

SF₆ gas insulated RMU – SafePlus

Be – busbar earth

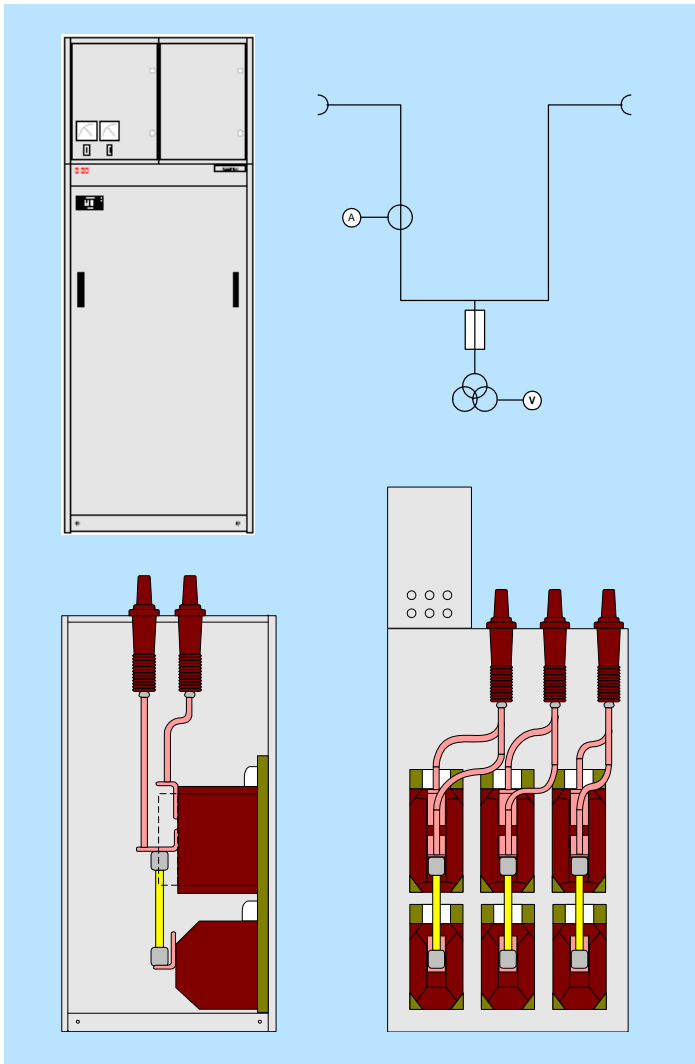


- Busbar earth
- Earth switch with making capacity

kV	12	24
A	630	630
kA	25 - 1s	21 - 3s
kA	21 - 3s	

SF₆ gas insulated RMU – SafePlus

M – metering

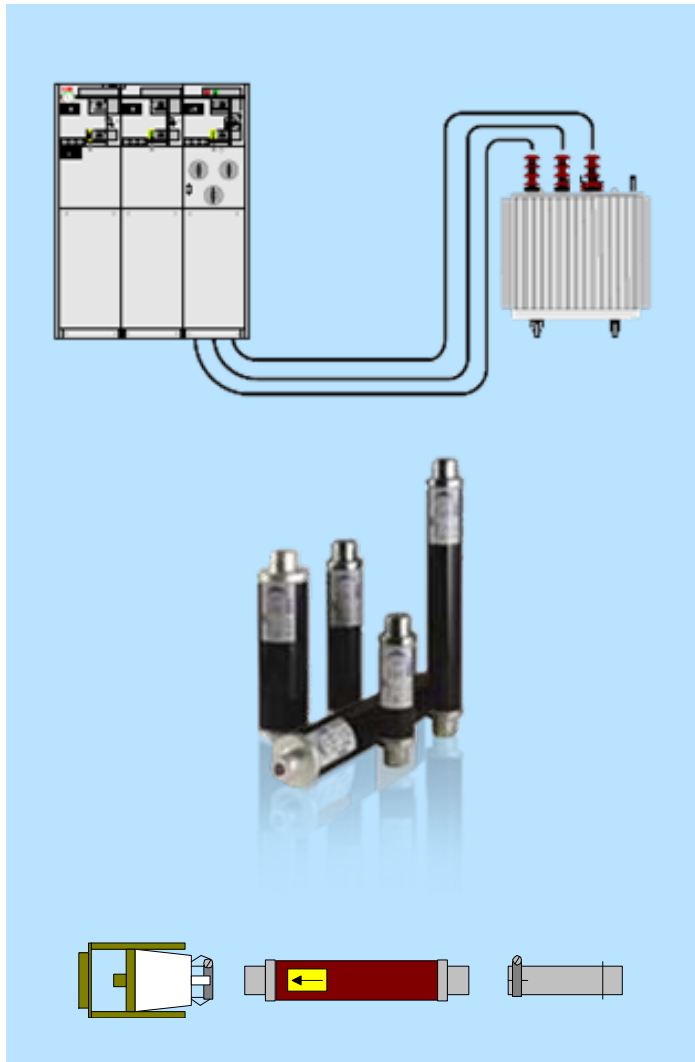


- Air insulated and factory assembled module
- Type tested with specific transformers
- 2 or 3 pcs DIN 42600 Narrow type CTs with ribs
- 3 pcs DIN 42600 Narrow type single pole VTs
- Fuses on VT primary (optional)
- 400 series bushings for busbar connection
- Bottom cable entry available

kV	12	24
A	630	630
kA	25 - 1s	21 - 3s
kA	21 - 3s	

SF₆ gas insulated RMU – SafePlus

Fused protection



Switch fuse combination offers

- Optimal short-circuit protection:
 - Fast interrupting
 - Current limiting – reduces stress
 - Cost efficient
- Considerations:
 - Fuses are consumables
 - Availability of stock
 - Transformer size
- Fuse selection table supplied with each switchgear – accounting for thermal derating

SF₆ gas insulated RMU – SafePlus Relays – selfpowered



- CT powered protection relay (no external power supply necessary)
- Economical
- Easy adjustment
- Perfect for large distribution transformers

Delivery range:

- Circutor MPRB 99:
Easy to adjust, the classic solution
- WIC1:
New flexible relay with several characteristics including definite time
- PR512:
Relay with advanced earth fault function
- REJ 603:
New ABB protection relay

SF₆ gas insulated RMU – SafePlus Relays – feeder protection



- Advanced protection schemes
- Possible use of sensors (SensoREX)
- Auxiliary power required

Delivery range:

- SPACOM range; e.g. SPAJ140
- REJ525 short-circuit and earth fault protection
- SensoREX, offers current and voltage measurement with combi-sensors
- Others on request



SF₆ gas insulated RMU – SafePlus Relays – feeder terminals type REF



- Configurable protection and control schemes
- Possible use of sensors
- Auxiliary power required

Delivery range:

- REF SafePlus (REF541)
- REF542 *plus* (standard case)



SF₆ gas insulated RMU – SafePlus

Remote control and monitoring of RMU



Integrated solution with main components:

- RTU211:
16DI, 8DO, 6AI, 24-110 V DC
- Additional I/O:
16DI (optional)
- Battery charger:
(110 or 220 V AC / 24 V DC)
- Batteries:
2 x 12 V DC (20 Ah)
- Communication devices:
 - V23 fixed line modem
 - Dial up modem
 - RS-232 for external devices
- Heater (optional)
- Surge arresters (auxiliary supply and communication interface)

SF₆ gas insulated RMU – SafePlus External busbar



- Easy
- Simple
- Reliable
- Sealed & screened
- Safe
- Completed

SF₆ gas insulated RMU – SafePlus External busbar



- Easy
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SF₆ gas insulated RMU – SafePlus External busbar



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SF₆ gas insulated RMU – SafePlus External busbar



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SF₆ gas insulated RMU – SafePlus External busbar



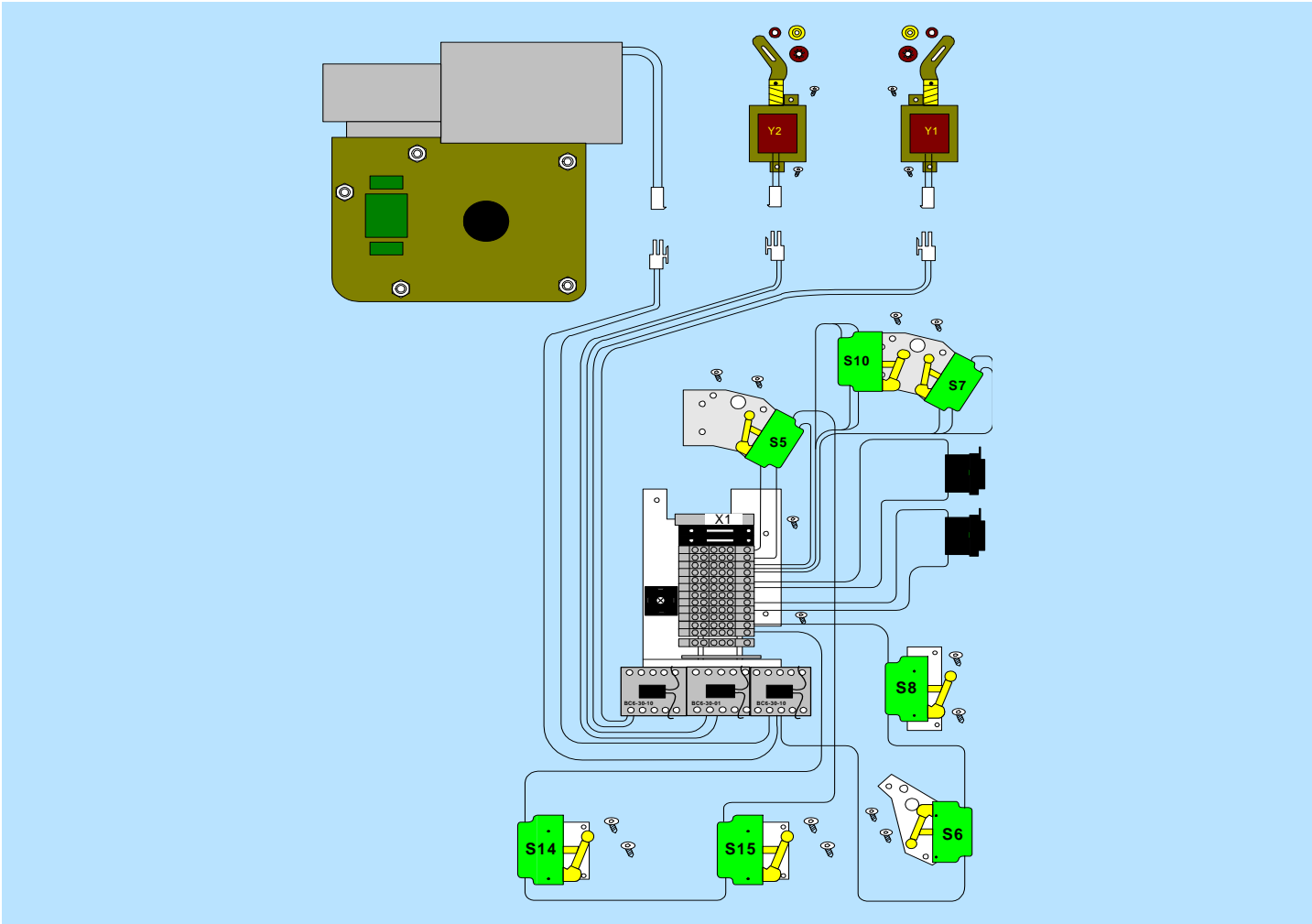
- Easy
- Simple
- Reliable
- Sealed & screened
- Safe
- Completed

SF₆ gas insulated RMU – SafePlus External busbar

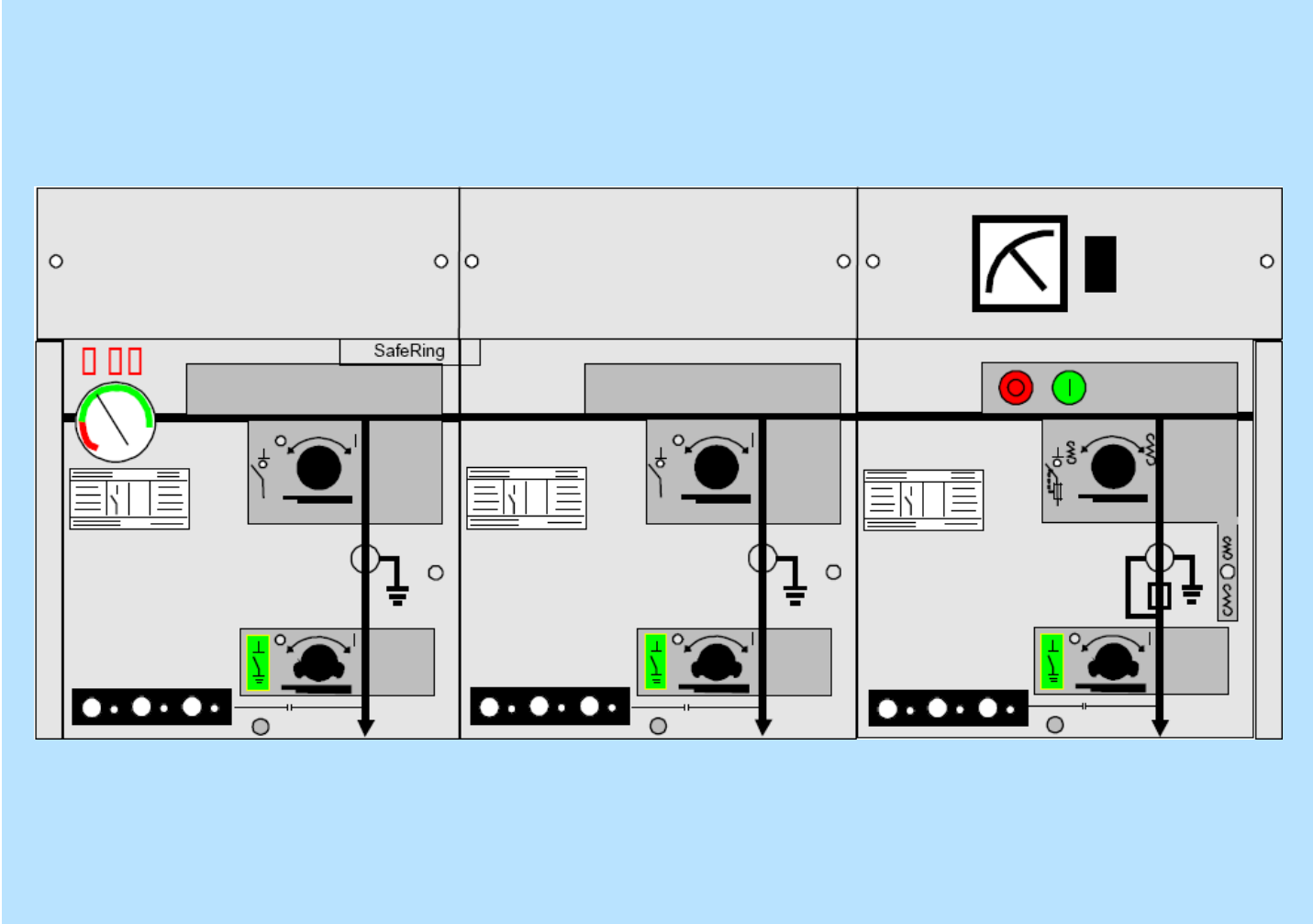


- Easy
- Simple
- Reliable
- Sealed & screened
- Safe
- Completed

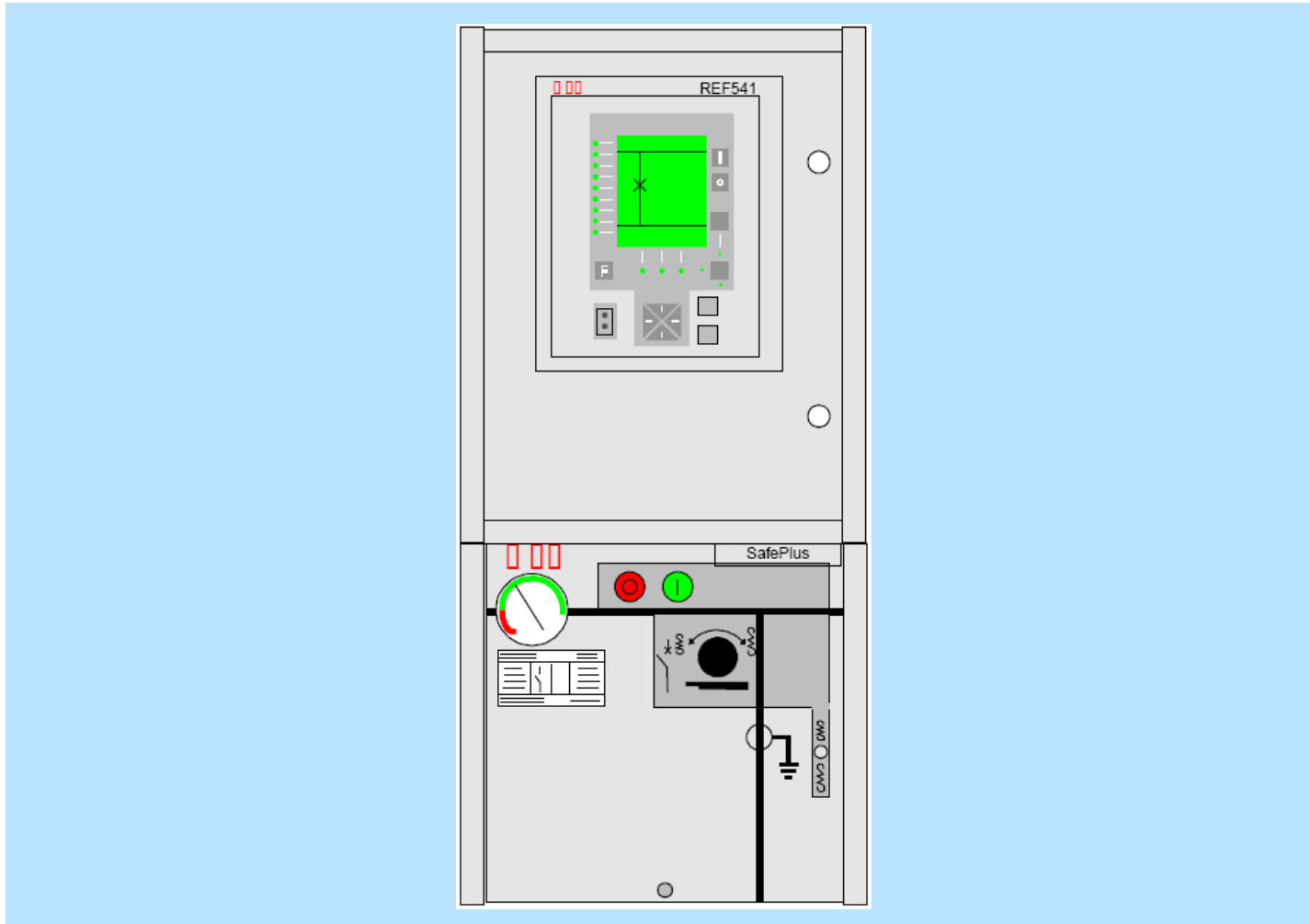
SF₆ gas insulated RMU – SafePlus Accessories – Motor operation complete



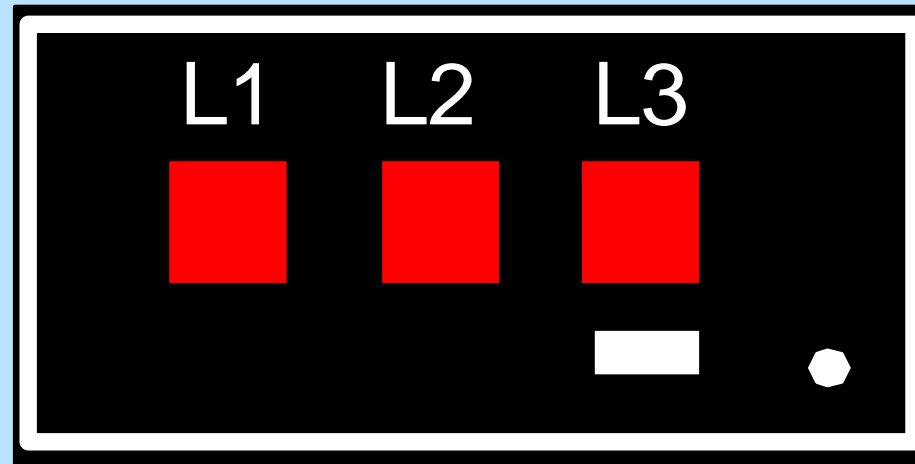
SF₆ gas insulated RMU – SafePlus Accessories – Top entry unit



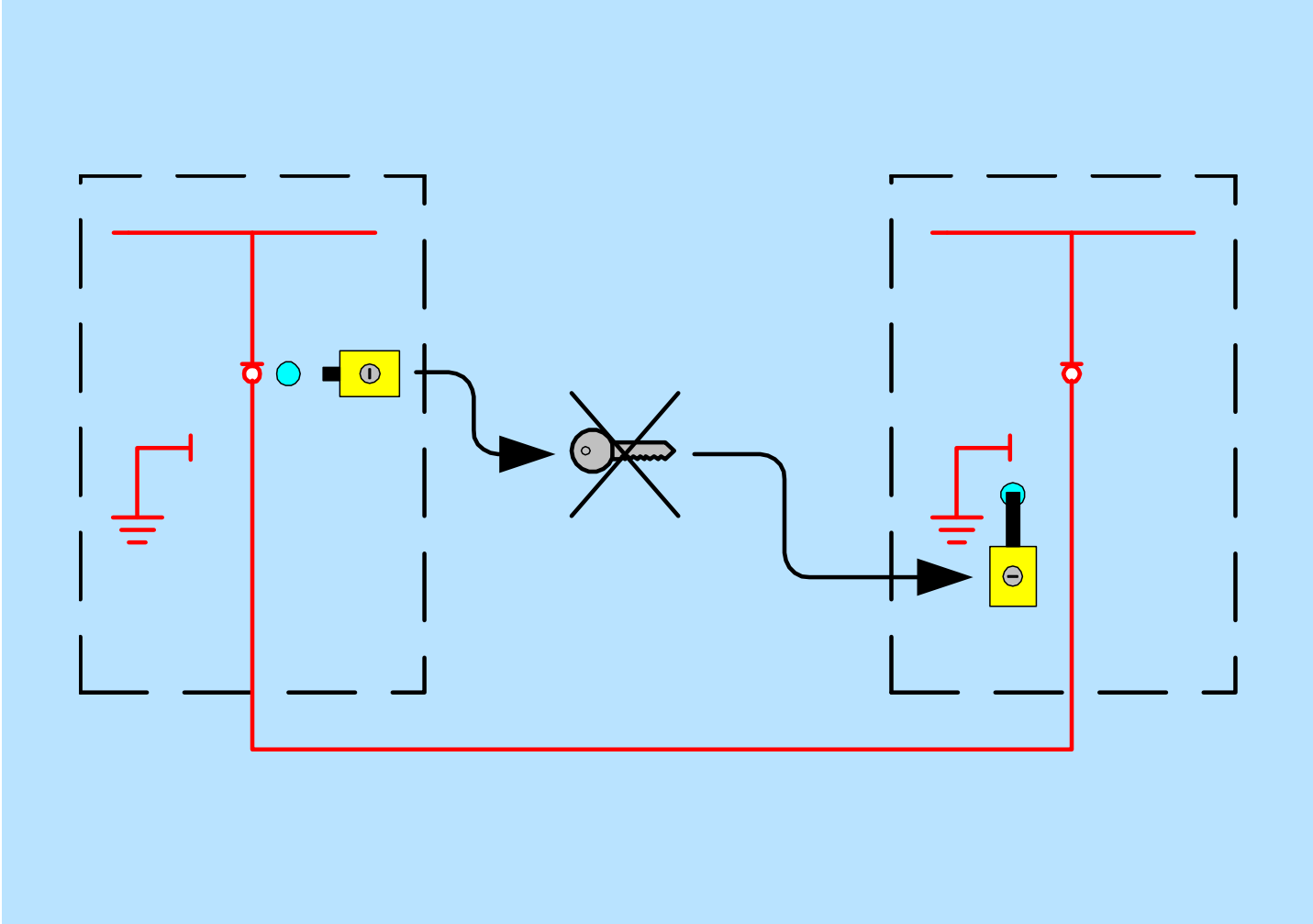
SF₆ gas insulated RMU – SafePlus Accessories – Low voltage box



SF₆ gas insulated RMU – SafePlus Accessories – Short circuit indicator

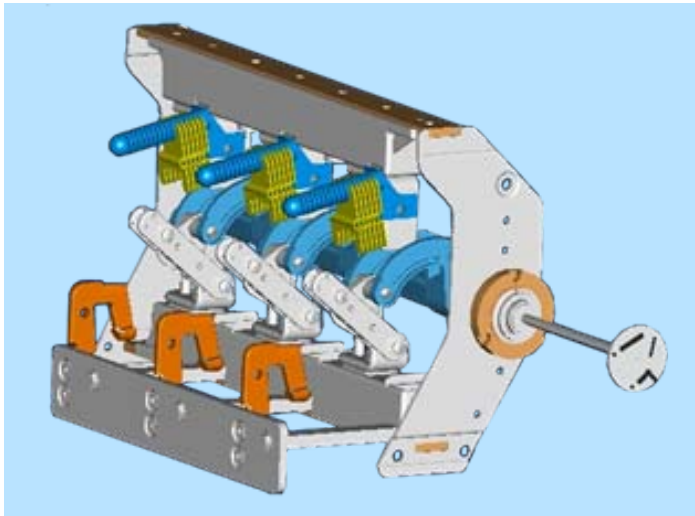


SF₆ gas insulated RMU – SafePlus Accessories – Ronis interlocking



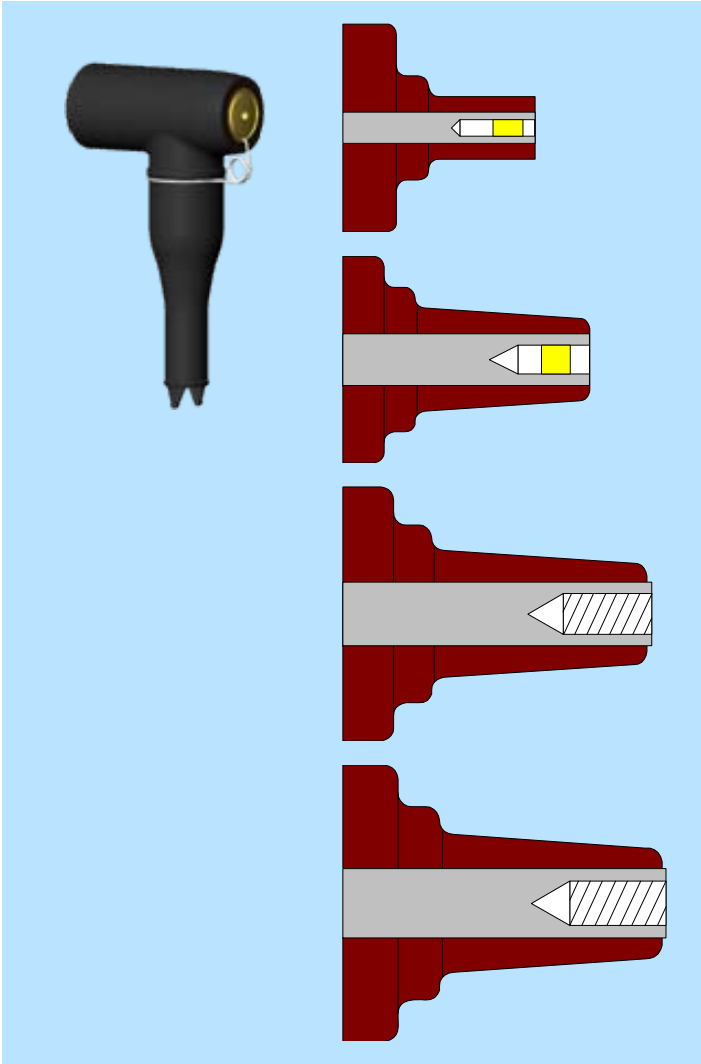
SF₆ gas insulated RMU – SafePlus

Direct position indication



- Direct indication of switch-device's shaft
- Laser graved indication
- Indication can be stressed 2 times the torque of the operation operations shaft

SF₆ gas insulated RMU – SafePlus Cable termination – bushings



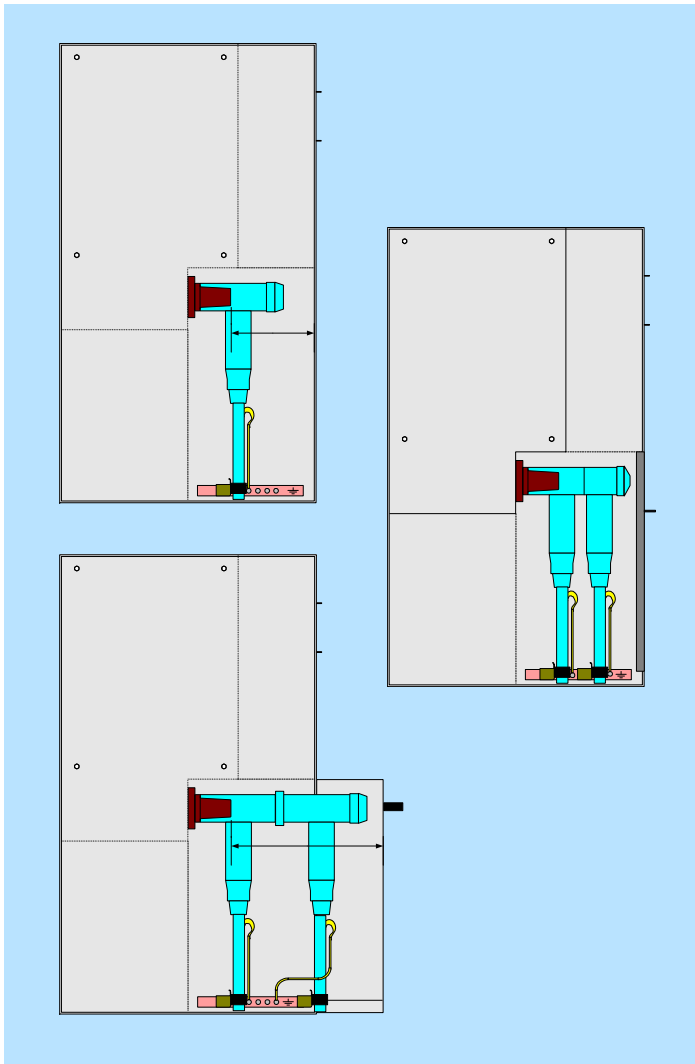
Series 200, plug-in, 200 A

Series 400, plug-in, 400 A

Series 400, bolted, 630 A

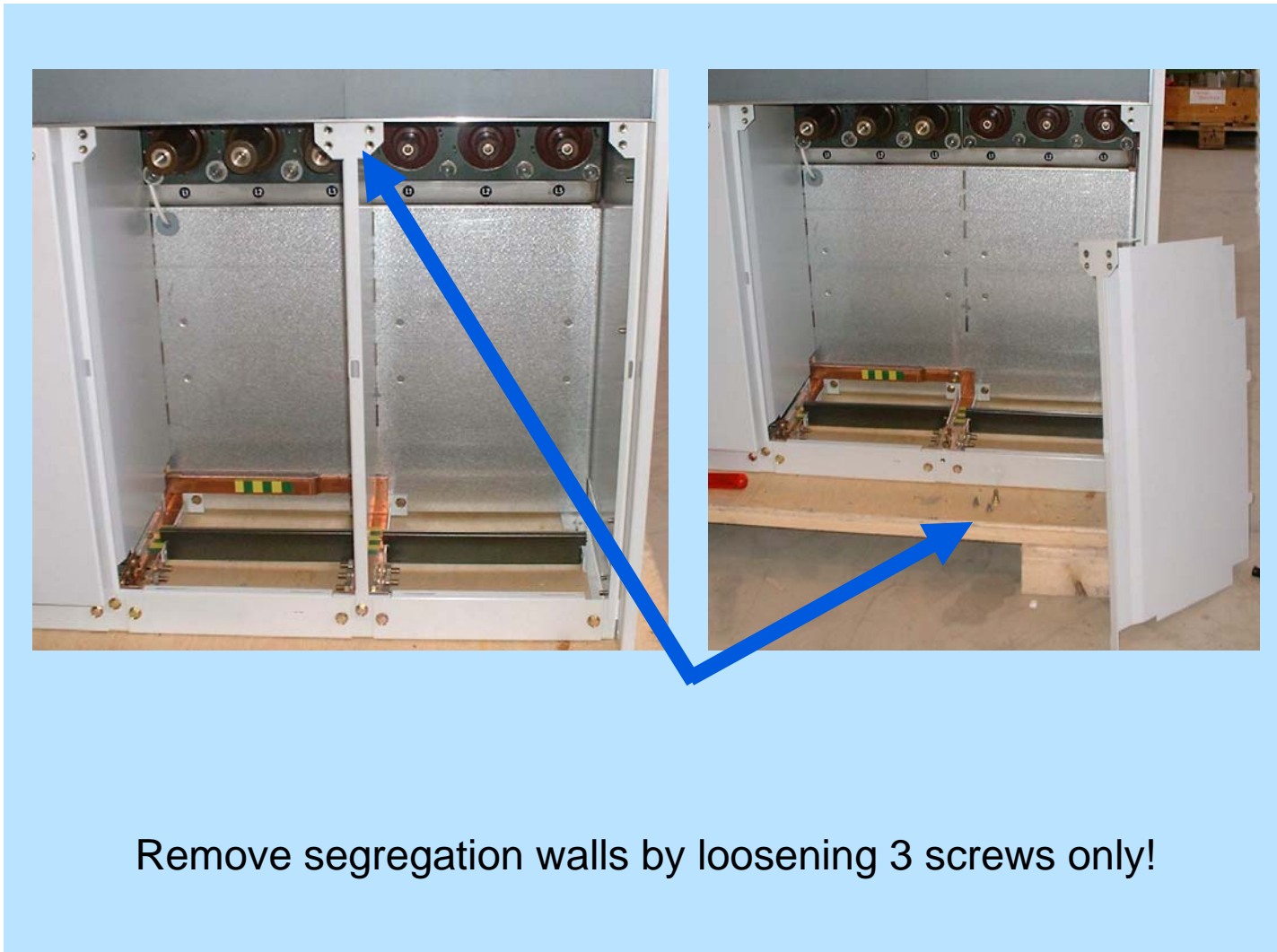
Series 600, bolted, 630 A

SF₆ gas insulated RMU – SafePlus Cable connection



- All bushings – same height
- Simplified installation:
 - Front dismantle
 - Cable cut one length
 - Adjustable cable support
- Double adapters (e.g. NKT) and surge arresters fits behind cable cover
- Double front covers available
- Arc proof cable compartment available

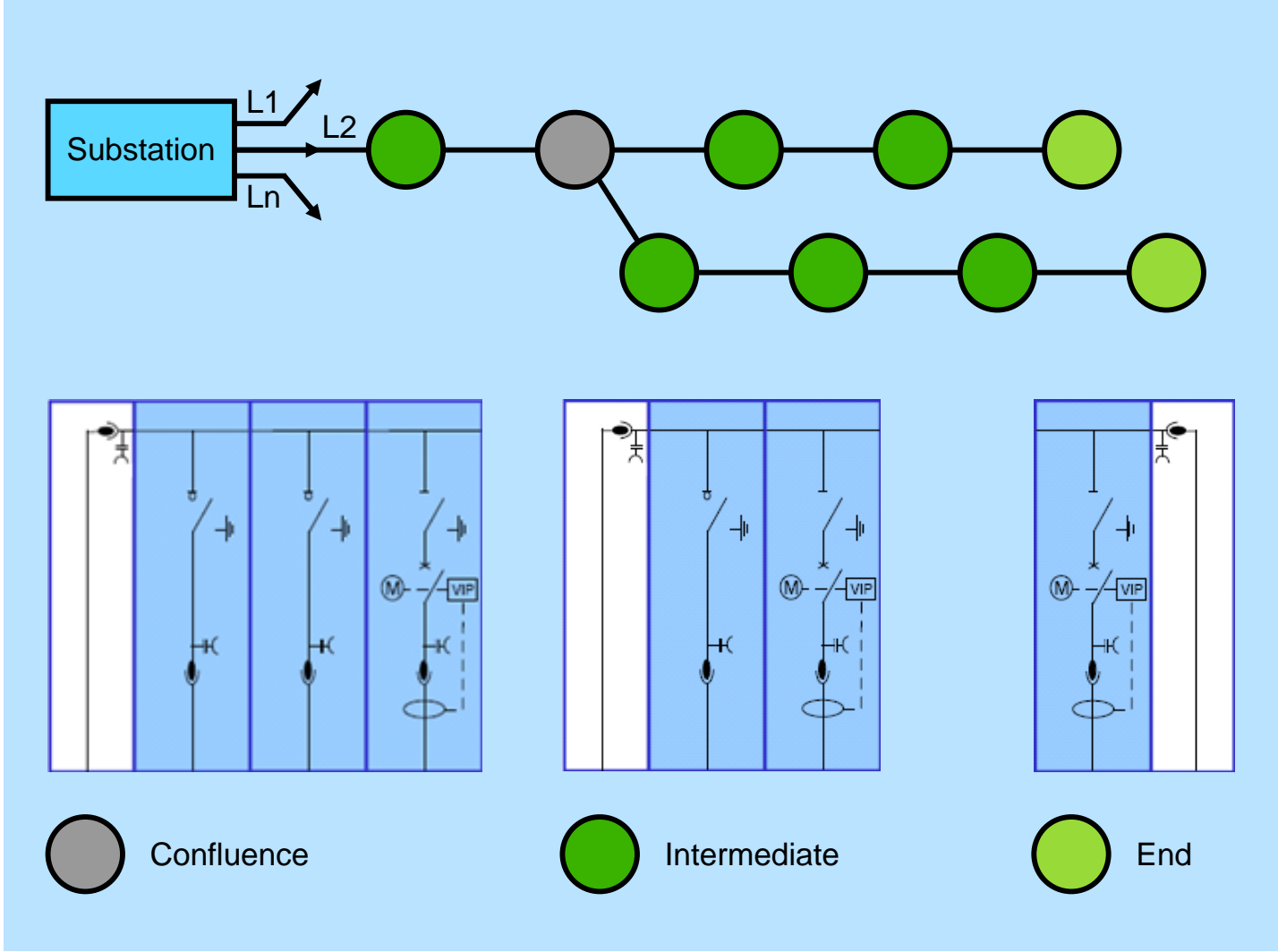
SF₆ gas insulated RMU – SafePlus Cable compartment



Remove segregation walls by loosening 3 screws only!

SF₆ gas insulated RMU – SafePlus

Typical wind farm configurations – onshore



SF₆ gas insulated RMU – SafePlus

Special solutions for wind applications



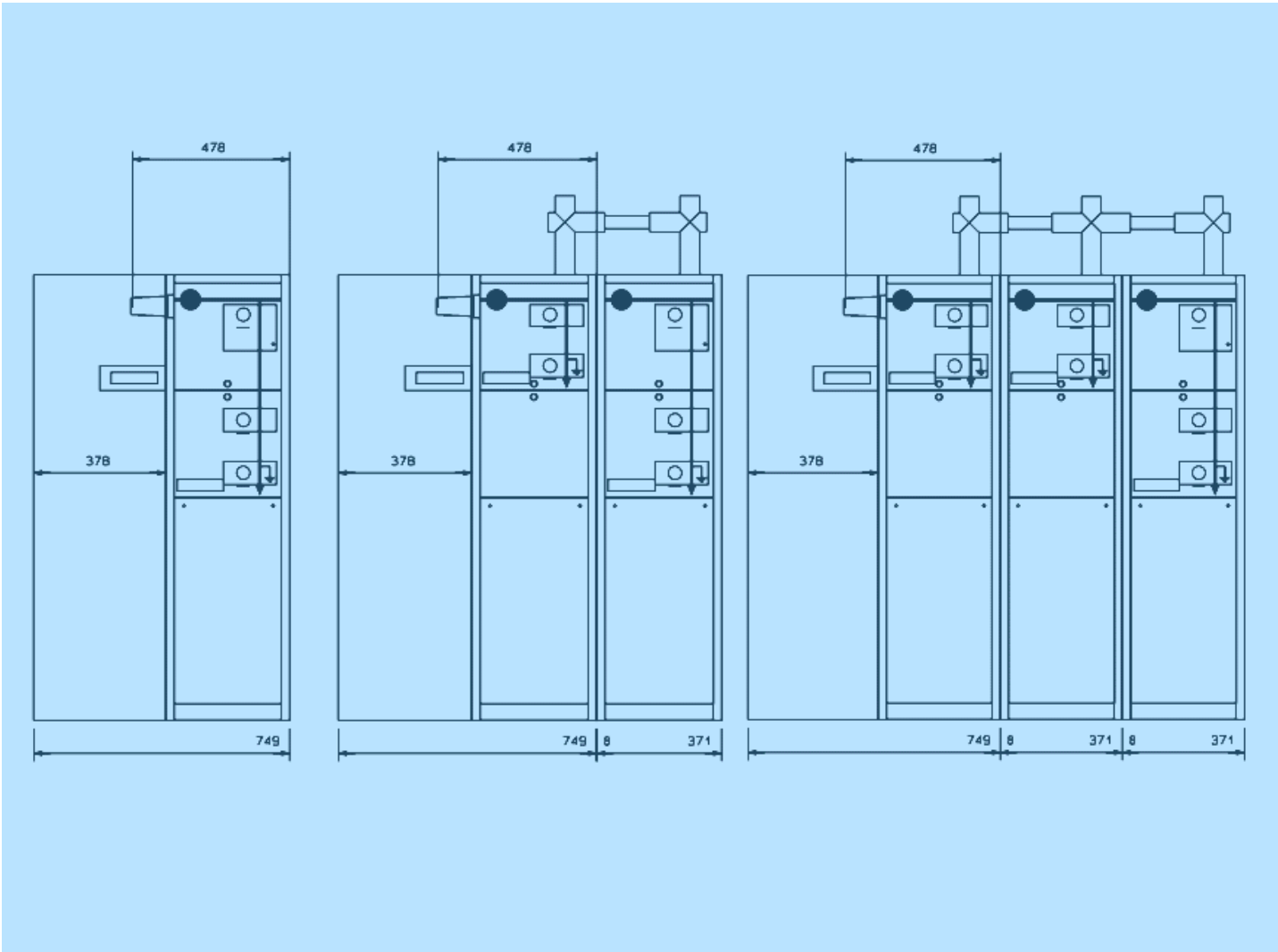
- Configurations in modular or compact design
- T-off with fuse or CB protection
- Standard with voltage indication system
- Optional with Ronis interlocking system



Installations

- Onshore: Inside tower or integrated in CSS
- Offshore: Inside tower

SF₆ gas insulated RMU – SafePlus Modular 24 kV with circuit-breaker



SF₆ gas insulated RMU – SafePlus

Special execution for wind applications



- Pressure relief channel with integrated absorber and pressure relief upwards into the tower
- Available for 2 and 3way applications

Power and productivity
for a better world™

