

NorMax Air

Air-insulated switchgear system



Customised power distribution
and automation solutions
for every need.



NorMax Air MV switchgear

Norelco's NorMax Air is an air-insulated, modular medium-voltage switchgear system designed for rated voltages of 12 and 24 kV. The switchgear has undergone extensive type testing, ensuring safe operation and a long service life.

Versatile and safe technical solutions

The NorMax Air system is ideally suited for use in building substations, solar power plants, electrical substations, and other secondary distribution applications. It is an environmentally friendly, completely SF6-free solution, with pressurised air used as the insulating medium.

NorMax Air is a cost-effective solution with excellent usability throughout its entire life cycle. The switchgear system consists of a wide range of different module options.

NorMax Air – Cubicle Types and Dimensions					
Bay Type	Type	Dimensions			
		Width mm	Height mm	Depth mm	Weight kg
Load disconnecter cubicle	MaxLo	500	1800	1120	225
Fuse-switch disconnecter cubicle	MaxFu	500	1800	1120	240
Circuit breaker cubicle	MaxBr	750	2100	1120	380
Metering cubicle	MaxMe	750	1800	1120	355
Metering cubicle with earthing switch	MaxMe/E	750	1800	1120	370
Cable cubicle	MaxCa	500	1800	1120	115

The low installation costs and excellent installability of NorMax Air are based on the switchgear's modular design. The cable compartment is spacious, allowing cables to be connected easily and quickly using straight indoor terminations. The load disconnecter bay provides sufficient space for standard surge arresters; no special terminations are required.

In the event of a fault, it is possible to replace only the affected unit or cubicle in NorMax Air, rather than the entire switchgear assembly as is typical with traditional RMUs. On-site installation time is reduced thanks to ample working space and a removable roof that enables fast connection of shipping splits.

The availability of the NorMax Air is excellent, produced quickly on a project-specific basis. Technical support and maintenance services are always close at hand. In addition, key components such as disconnectors and circuit breakers are kept in stock, ensuring reliable spare parts availability.

The switchgear can also be supplied on a turnkey basis, fully installed at the site. Installation carried out by our experienced installers is fast, and the result is a reliable, high-quality system. Protective relays can also be parameterised and factory-tested in advance.

Technical overview

Reliable MV switchgear manufactured in accordance with both domestic and international standards.

TECHNICAL INFORMATION	
Type	NorMax Air 12 / NorMax Air 24
Rated frequency f	50 Hz
Rated voltage U	12 / 24 kV
Rated current I	630A
Power-frequency withstand voltage Ud	28 / 50 kV
Impulse withstand voltage Up	75 /125 kV
Short-time withstand current Ik	20 kA / 1s
Peak withstand current Ip	50kA
Protection against electric shock	Protective earthing
Internal arc classification (IAC AFL)	16kA, 1s
Partitioning	Metal-enclosed
Operating class	LSC2A, LSC1
IP class	IP2XC
Operating temperature	-5 ... +40 C

System structure

NorMax Air is a compartmentalised, metal-enclosed switchgear system in which the compartments are separated by steel sheet structures.

- 1. Busbar compartment:** Air-insulated compartment located in the upper part of the switchgear. Extends across the full width of the switchgear
- 2. Load disconnecter compartment:** Three-position load disconnecter with pressurised air as the insulating medium. Positions: closed, open, or earthed.
- 3. Cable termination compartment:** Designed with maximum space to facilitate easy installation of cable terminations. Space provided for several accessories, such as surge arresters. Door is mechanically interlocked and cannot be opened when energised. Cable entries provided through the base plate
- 4. Low-voltage (secondary) compartment:** Houses protection relays and other control equipment. Optional control and alarm contacts, as well as trip coil terminals, are also wired to this compartment

The operating mechanisms of NorMax Air switchgear are designed to be as simple and intuitive as possible for the user. Mechanical operation requires only a single operating handle, which is used for both the load disconnecter and the earthing switch.

For safety reasons, incorrect operations are always mechanically prevented. Fixed voltage indication is provided as standard in all cubicles.

Busbars: The main busbar system consists of copper round busbars. The cubicle busbars and earthing busbars are copper floor-mounted busbars.

Structural components: The enclosure components are manufactured from hot-dip galvanised steel sheet with a heavy zinc coating of 275 g/m². Surface finishing is carried out using epoxy powder coating; the standard colour is white RAL 9016. The switchgear base plates can be removed during cabling, as can the front plates of the optional plinth.

Primary equipment

The operation of all switchgear cubicles is based on the load disconnecter. It is a three-position load disconnecter with closed, open and earthed positions.

In circuit breaker cubicles the load disconnecter allows the circuit breaker to be isolated from the busbar system, meaning that replacement of the circuit breaker or current transformers can be carried out without interrupting the supply to the entire switchgear, unlike in traditional solutions.

The fuse-switch disconnecter provides protection for equipment and users. The fuse-switch disconnecter is equipped with holders for medium-voltage fuses. When a fuse operates, it automatically trips the load disconnecter to the open position.

To ensure user safety, the fuse-switch disconnecter includes a second earthing disconnecter in addition to the one integrated in the load disconnecter, allowing both sides of the fuse to be earthed during fuse replacement.

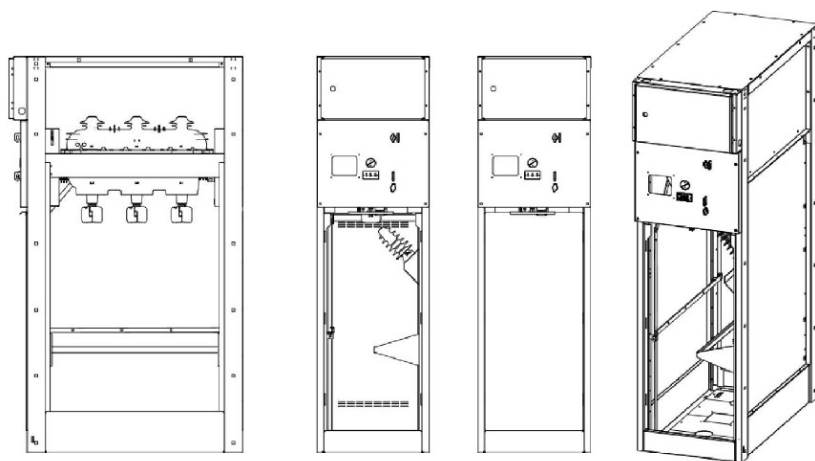
Comprehensive monitoring and protection with the circuit breaker. As standard, NorMax Air is equipped with a maintenance-free vacuum circuit breaker, which is controlled by the cubicles protection relay.

A reliable relay selected by Norelco, providing overcurrent, short-circuit and earth-fault protection, is used as standard. Alternatively, a protection relay specified by the customer can be supplied.

Load disconnecter cubicle MaxLo

The load disconnecter cubicle is used as an incoming, ring or feeder cubicle. The cubicle is equipped with a three-position load disconnecter and its operating mechanism. The busbar system is air-insulated. The load disconnecter can be in only one position at a time: closed, open or earthed.

The open, closed and earthed positions are indicated on the operating panel by position indicators. Operation of the load disconnecter is simple, and incorrect operations are mechanically interlocked. All operations can be carried out using a single operating handle. The structural design of the switchgear frame allows components to be replaced even after the switchgear has been installed.



Standard equipment

- Three-position load disconnecter
- Operating mechanism with mechanical position indicator
- Enclosed busbar compartment
- Integrated low-voltage (secondary) compartment with door
- Locking mechanism
- Fixed voltage indication L1–L3
- Auxiliary contacts for closed position (5 NO + 5 NC) and earthed position (2 NO + 2 NC)
- Pressure gauge

Lower module

- Enclosed cable termination compartment
- Cable support and base plate with cable entry openings
- Earthing busbar passing through the cubicle

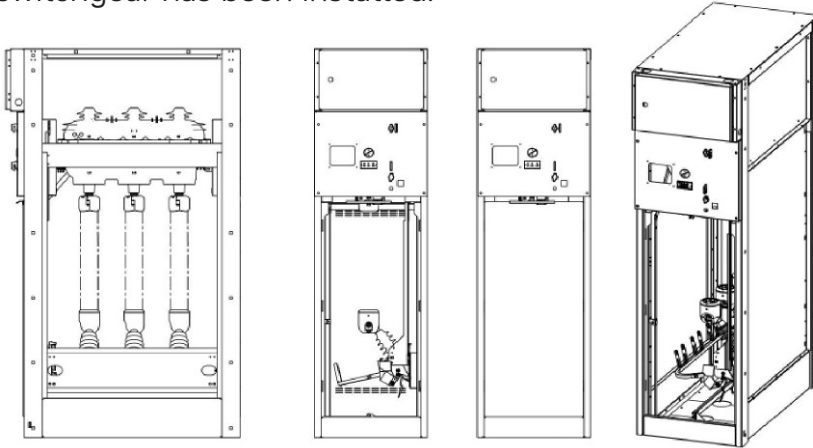
Optional accessories

- Internal arc pressure relief duct
- Air-insulated surge arresters
- Short-circuit indicator
- Motor operating mechanism
- Condition monitoring

Fuse-switch disconnecter cubicle MaxFu

The fuse-switch disconnecter cubicle is used as a distribution transformer switching device or for protection purposes. The cubicle is equipped with a three-position load disconnecter and a separate associated earthing switch, together with their operating mechanisms. The busbar system is air-insulated. Fuses can be safely replaced when de-energised, as earthing is applied on both sides of the fuses. Operation of a single fuse causes the disconnecter to open three-pole. The load disconnecter can be in only one position at a time: closed, open or earthed.

The open, closed and earthed positions are indicated on the operating panel by position indicators. Operation of the load disconnecter is simple, and incorrect operations are mechanically interlocked. All operations can be carried out using a single operating handle. The structural design of the switchgear frame allows components to be replaced even after the switchgear has been installed.



Standard equipment, upper module

- Three-position load disconnecter
- Operating mechanism with mechanical position indicator
- Enclosed busbar compartment
- Integrated low-voltage (secondary) compartment with door
- Locking mechanism
- Fixed voltage indication L1–L3
- Trip coil
- Auxiliary contacts for closed position (5 NO + 5 NC) and earthed position (2 NO + 2 NC)
- Pressure gauge

Lower module

- Earthing switch
- Fuse holders
- Enclosed cable termination compartment
- Base plate with cable entry openings and cable support
- Earthing busbar passing through the cubicle

Optional accessories

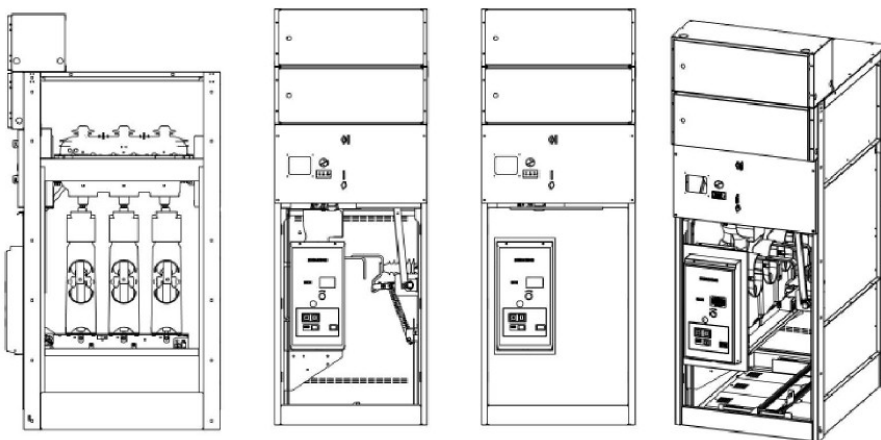
- Internal arc pressure relief duct, and condition monitoring

Circuit breaker cubicle MaxBr

The circuit breaker cubicle is used, for example, for the switching and protection of electricity distribution systems, motors, distribution transformers and capacitors. The cubicle is equipped with a maintenance-free vacuum circuit breaker and its associated protection relays. A three-position load disconnecter and its operating mechanism are installed between the busbar system and the circuit breaker. The busbar system is air-insulated. To prevent incorrect operation, the load disconnecter can be in only one position at a time: closed, open or earthed.

The open, closed and earthed positions are visible on the operating panel via position indicators. Operation of the load disconnecter is simple, and incorrect operations are mechanically interlocked. The circuit breaker is maintenance-free and equipped with a spring-charged operating mechanism and control coils. Thanks to the modular switchgear design, the entire bay can also be replaced quickly and easily when required.

Two versions of the circuit breaker cubicle. 1. Outgoing feeder cubicle: no separate earthing switch; earthing is carried out via the load disconnecter when the circuit breaker is locked in the closed position. 2. Incoming feeder cubicle: disconnectors plus a separate earthing switch (forthcoming).



Standard equipment, upper module

- Three-position load disconnecter
- Operating mechanism with mechanical position indicator
- Enclosed busbar compartment
- Integrated low-voltage (secondary) compartment with door
- Locking mechanism
- Fixed voltage indication

L1–L3

- Protection relays
- Auxiliary contacts of the load disconnecter for closed position (5 NO + 5 NC) and earthed position (2 NO + 2 NC)
- Pressure gauge

Lower module

- Maintenance-free circuit breaker
- Enclosed cable termination compartment
- Base plate with cable entry

- openings and cable support
- Earthing busbar passing through the bay

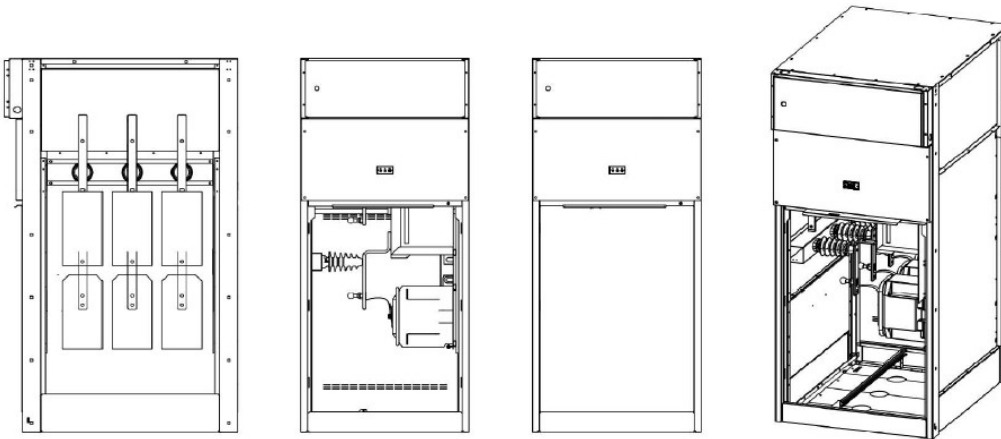
Optional accessories

- Motor operating mechanism
- Internal arc pressure relief duct
- Cable current transformers
- Separate earthing switch
- Condition monitoring
- Arc fault protection

Metering cubicle MaxMe

The metering cubicle is used for medium-voltage measurements and is highly adaptable, meeting most customer-specific requirements for both metering and cable arrangements. MaxMe is the basic version, which does not include an earthing switch; earthing is carried out using portable earthing equipment and earthing balls.

Voltage transformers and current transformers can be installed in the cubicle. To increase flexibility, the bay busbars are manufactured according to project-specific requirements. The structural design of the switchgear frame allows components to be replaced even after the switchgear has been installed. Operation and maintenance procedures are easy to perform thanks to well-designed and clearly accessible working spaces.



Standard equipment

- Busbars
- Integrated low-voltage (secondary) compartment with door
- Busbar bushings
- Required temporary earthing points
- Voltage fuses and metering terminal blocks
- Installation space for transformers
- Earthing busbar passing through the cubicle
- Fixed voltage indication L1–L3

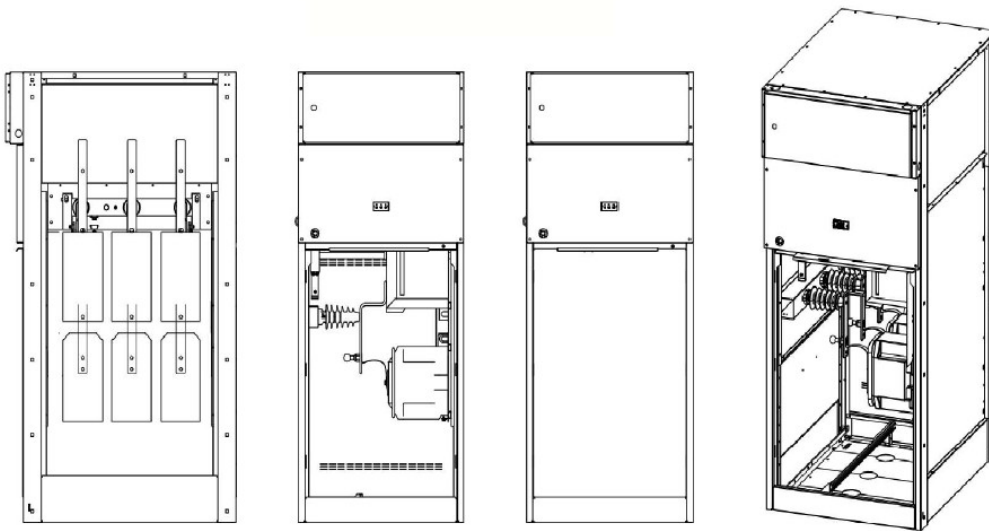
Optional accessories

- Current transformers
- Voltage transformers with damping resistor
- Internal arc pressure relief duct
- Condition monitoring

Metering cubicle MaxMe/E

The metering cubicle is used for medium-voltage measurement and is highly adaptable, meeting most customer-specific requirements for metering and cable arrangements. MaxMe/E is always supplied equipped with an earthing switch.

Voltage transformers and current transformers can be installed in the cubicle. To increase flexibility, the bay busbars are manufactured according to customer-specific requirements. The structural design of the switchgear frame allows components to be replaced even after the switchgear has been installed. Operation and maintenance procedures are easy to carry out thanks to well-designed and clearly accessible working spaces.



Standard equipment

- Air-insulated earthing switch
- Busbars
- Integrated low-voltage (secondary) compartment with door
- Busbar bushings
- Voltage fuses and metering terminal blocks
- Installation space for transformers
- Earthing busbar passing through the cubicle
- Fixed voltage indication L1–L3

Optional accessories

- Current transformers
- Voltage transformers with damping resistor
- Internal arc pressure relief duct
- Condition monitoring

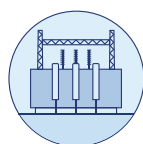
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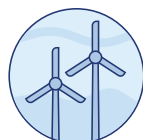
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