

# NATUS

INDUSTRIAL SOLUTION SYSTEMS

## NATUS NES / NES-H Draw-out Type Medium Voltage Switchgear Systems

Safe energy distribution that meets the highest industrial requirements





## NATUS switchgear systems – your advantages

- ◆ minimal use of insulant volumes
- ◆ use of standard components with the highest quality
- ◆ easy operation
- ◆ utmost personal safety

# NATUS Medium Voltage Switchgears: utmost personal safety, optimal availability

NATUS systems offer you high personal and operating safety, secure engineering, easy operation and high efficiency through low life-cycle costs. Take our word for it! Our engineers give you competent support and advice and see your project through from design all the way to commissioning.

### Application

Power plants, transformer substations and distribution systems and industrial operations such as:

- ◆ mining industry
- ◆ iron and steel works
- ◆ automobile industry
- ◆ chemical works
- ◆ petrochemical plants
- ◆ paper plants
- ◆ cement industry
- ◆ waste disposal

### The switchgears

NATUS switchgear systems are air-insulated, tested for resistance to internal arc faults and are metal-enclosed with a fourfold compartment.

NATUS switchgear systems are developed and manufactured in our factories in Trier and comply with the highest quality requirements. They are factory-assembled and type-tested in accordance with current standards and specifications.

Upon request, we can also deliver different makes of switching devices as well as innovative technical solutions.

NATUS switchgear systems stand apart because of their minimal use of insulant volumes, use of

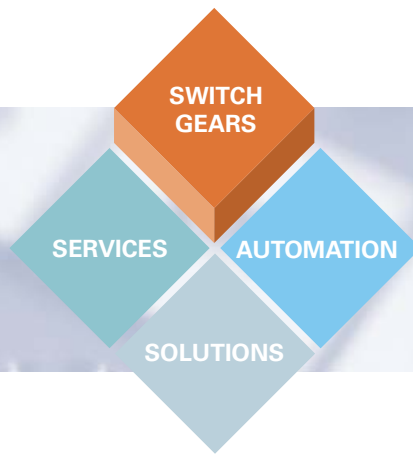
high-quality standard components, easy operation and utmost personal safety.

NATUS switchgear systems have proven themselves thousandfold worldwide.

### The standards

Construction of the switchgears as per IEC 62271-200 / VDE 0671 part 200. Tested for resistance to internal arc faults IAC AFLR as per IEC 62271-200 / VDE 0671 part 200 and IEC 60298 App. AA, criteria 1–6, earthquake testing in accordance with UBC 1997, zone 4.

NATUS medium voltage switchgears are standardly performed in accordance to availability classes LSC2B as per IEC 62271-200. The partition class can either be PM or PI, depending on the design.



Demanding customers across the world have put their faith in NATUS switchgear systems, and thus also in the quality and safety of our solutions.

## Draw out Type Medium Voltage Switchgears NES / NES-H

### Compact, type-tested switchgears for indoor installation in accordance with IEC 62271-200 / VDE 0671 part 200

- ◆ four individually metal-clad compartments for: the main busbar, the switching device, the cable connection and low voltage devices
- ◆ arc safe
- ◆ different panel widths: 1000 mm, 800 mm, 650 mm, 500 mm
- ◆ pressure is released upward in all compartments
- ◆ optional: delivery with a tested pressure release duct

### High personal and operating safety

- ◆ all electrical and mechanical operating procedures take place when the enclosure is closed
- ◆ maximized operating safety owing to serial production, complete mechanical interlocking system
- ◆ shutters automatically protect the isolating contacts when the unit is withdrawn
- ◆ high availability resulting from the quick exchange of the withdrawable units by means of the universal trolley

- ◆ make-proof earthing switch
- ◆ optional: motor operated withdrawable unit and earthing switch

### Durable and geared for the future

- ◆ panels are air-insulated and use a minimum amount of insulant volumes
- ◆ ideal assembly is possible due to technical and economical factors
- ◆ assembly of state-of-the-art, low maintenance vacuum- or SF6-switching devices by renowned, leading manufacturers
- ◆ one can obtain spare parts easily by virtue of the use of standard insulators, standard instrument transformers, standard switching devices and standard copper sections

### Highest quality requirements

- ◆ state-of-the-art manufacturing techniques thanks to a high precision laser cutting system which guarantees perfect dimensional accuracy
- ◆ distortion resistant cubicle frame made of top quality galvalumed sheet steel that is bolted together

- ◆ internal arc resistant double sheet steel partitions between panels
- ◆ busbar partitioning from panel to panel
- ◆ electrostatic powder coating of the front door and side panels
- ◆ engineering and manufacturing in accordance with the quality management system EN ISO 9001

### Type of protection as per IEC 60259 / VDE 0470 part 1

- ◆ standard make of the enclosure: IP3XD
- ◆ further values upon request

### Operating conditions

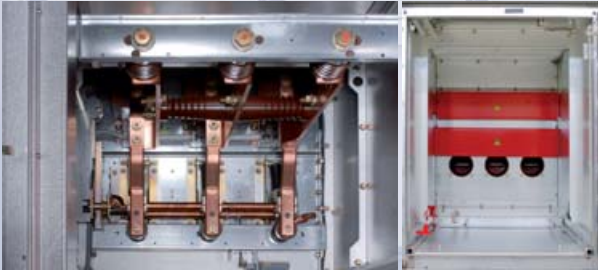
The standard make of our switchgears are designed for the following:

- ◆ ambient temperature:
  - maximum temperature + 40 °C
  - 24-hour mean + 35 °C
  - minimum temperature – 5 °C
- ◆ installation altitude maximum 1000 m above sea level
- ◆ humidity
  - 24-hour mean 95 %



### NATUS switchgear systems – safe and versatile

- ◆ type, arc fault and earthquake tested
- ◆ metal-enclosed and air-insulated
- ◆ draw-out type
- ◆ single and double busbar system



## Medium Voltage Switchgear NES:

### The switchgear for multifunctional use

- ◆ draw-out type switchgears for the indoor installation, type-tested, factory-assembled, air-insulated, metal-enclosed with a fourfold compartment
- ◆ compact panel for contactor feeder that is 500 mm wide
- ◆ application as a single bus system or as a duplex system
- ◆ optional: motor operated withdrawable units and earthing switches

The following variations are possible for the conduction of hot gases that result from arc faults:

- deflector plate
- arc absorber
- pressure release duct

### Technical data: NES

Rated values	up to			
rated voltage	12 kV			
rated power-frequency withstand voltage	28 kV			
rated lightning impulse withstand voltage	75 kV			
rated busbar current	2,500 A			
rated short-time withstand current	40 kA			
rated peak withstand current	100 kA			
rated short-circuit duration	3 s			
internal arc fault test 1 s**	40 kA			

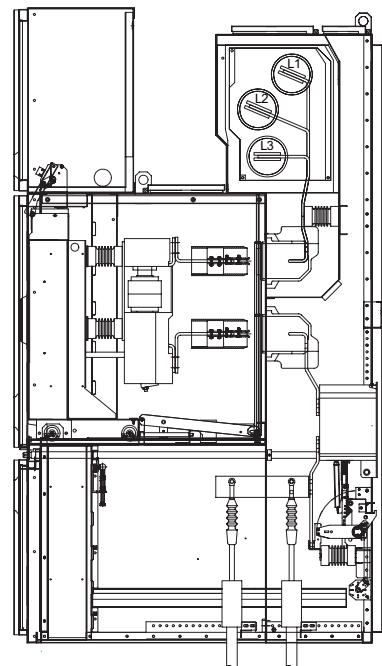
### Dimensions

rated branch current up to:	2,500	2,000	1,100	350 A
cubicle width	1,000	800	650	500 mm
cubicle depth*	1,300	1,300	1,300	1,300 mm
cubicle height	2,300 up to 2,500 mm			
	incl. control compartment H = 600 up to 800 mm			

\* plus 92mm for front door and back wall

\*\* tested contactor panel 40 kA / 0.1s

Further values upon request





**NATUS switchgear systems – best customer services**

- ◆ our engineers advise you competently
- ◆ they assist you and your project from design right through to commissioning

## Medium Voltage Switchgear NES-H:

The high-performance switchgear that meets the highest requirements

- ◆ draw-out type switchgear system for the indoor installation, type-tested, factory-assembled, air-insulated, metal-enclosed with a fourfold compartment
- ◆ application as a single bus system or as a duplex system
- ◆ optional: motor operated withdrawable units and earthing switches

The following variations are possible for the conduction of hot gases that result from arc faults:

- deflector plate
- pressure release duct

**Technical data: NES-H**

Rated values	up to	up to		
rated voltage	12	24	kV	
rated power-frequency withstand voltage	28	50	kV	
rated lightning impulse withstand voltage	75	125	kV	
rated busbar current	4,000	2,500	A	
rated short-time withstand current	50	31.5	kA	
rated peak withstand current	125	80	kA	
rated short-circuit duration	3	3	s	
internal arc fault test 1 s	50	31.5	kA	

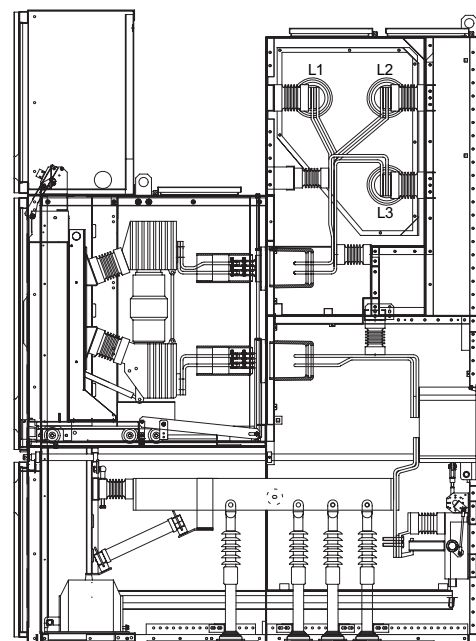
**Dimensions**

rated voltage	24	12	12	12	kV
rated branch current up to: (natural / air cooled)	2,000	2,900	2,500	350	A
rated branch current up to: (forced ventilation)	-	3,800	3,300	-	A
cubicle width**	1,000	1,000	800	2x500	mm
cubicle depth*	1,700	1,700	1,700	1,700	mm
cubicle height					2,300 up to 2,500 mm
					incl. control compartment H = 600 up to 800 mm

\* plus 77mm for front door and back wall

\*\* 2x500mm = contactor panel with a maximum of 2 outgoing feeders

Further values upon request





### NATUS switchgear systems – well proven worldwide

- ◆ well engineered technology
- ◆ high profitability
- ◆ low life-cycle costs

## Medium Voltage Switchgear NES-H18:

### The switchgear that meets high-current requirements

- ◆ draw-out type switchgear system for the indoor installation, type-tested, factory-assembled, air-insulated, metal-enclosed with a fourfold compartment
- ◆ circuit-breaker in truck types starting at 3.150 A
- ◆ application as a single bus system or as a duplex system
- ◆ optional: motor operated withdrawable units and earthing switches

The following variations are possible for the conduction of hot gases that result from arc faults:

- deflector plate
- pressure release duct

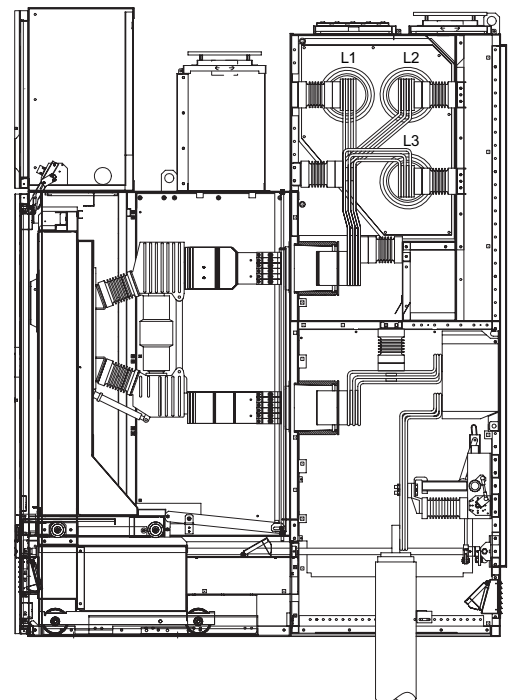
### Technical data: NES-H18

Rated values	up to	up to	
rated voltage	12	17.5	kV
rated power-frequency withstand voltage	28	38	kV
rated lightning impulse withstand voltage	75	95	kV
rated busbar current	4,000	4,000	A
rated short-time withstand current	55	50	kA
rated peak withstand current	137.5	125	kA
rated short-circuit duration	3	3	s
internal arc fault test 1 s	50	50	kA

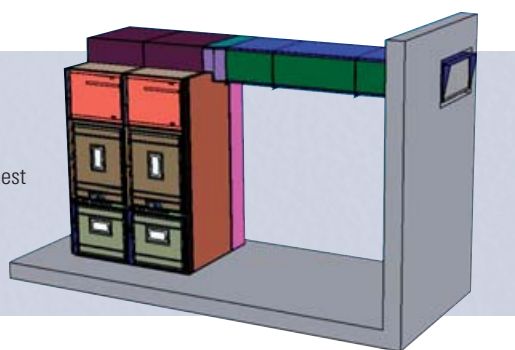
### Dimensions

rated voltage	17.5	17.5	17.5	kV
rated voltage switchgear	3,150	4,000	—	A
rated branch current up to: (natural- / air cooled)	3,150	3,400	2,500	A
rated branch current up to: (forced ventilation)	4,000	4,200	3,300	A
cubicle width	1,000	1,000	800	mm
cubicle depth*	1,800	1,800	1,800	mm
cubicle height			2,300 up to 2,500	mm
			Incl. control compartment H = 600 up to 800	mm

\* plus 77mm for front door and back wall  
Further values upon request



Arc-fault tested pressure release ducts fulfil the highest safety requirements



## The compartments in accordance with the standard availability class LSC2B

### A Busbar compartment

The busbars are made of standard flat copper with rounded edges. The main busbars are screwed together panel-for-panel and are segregated by cast-resin bushings panel-for-panel. The electric strength of the main busbar is guaranteed without additional insulation.

### B Circuit breaker compartment

The withdrawable units can be equipped with a diverse amount of customer specific switching devices (vacuum, SF6). The operation of the withdrawable unit can only be done behind closed doors. Mechanical interlocks prevent maloperation. When removing the withdrawable unit, all live parts are automatically protected by metal shutters.

### C Cable terminal compartment

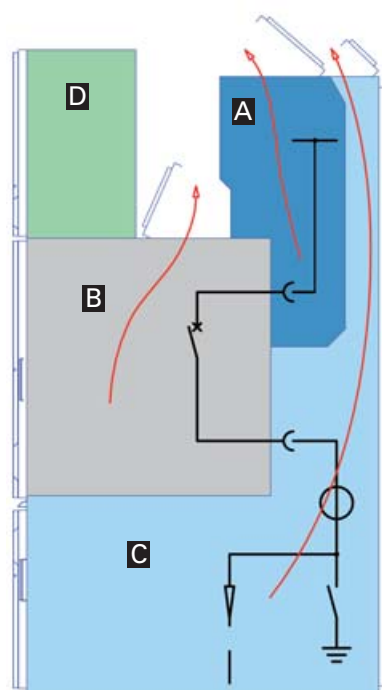
The generously sized cable terminal compartment is easily accessible through its explosion proof front door. The panel's entire depth can be used for the installation of instrument transformers, earthing swit-

ches, surge arresters and cable looms for single-core cables up to  $5 \times 500 \text{ mm}^2$  (NES) or  $7 \times 500 \text{ mm}^2$  (NES-H).

### D Low voltage compartment

The low voltage compartment provides adequate space for all the necessary secondary technical components and can be delivered

with the following heights: 600 mm, 700 mm, 800mm. The withdrawable unit's position switch, for example, is installed here for easy accessibility. This means that one can access it without coming in contact with the high voltage sections. The distortion resistant door is adequate for the protective relays, measuring instruments, controllers and signalling units.



### Pressure relief

Pressure is generally released upward in our switchgear panels and not in the cable basement. We recommend that you use a pressure release duct for the targeted release in the switchgear building because of its utmost personal safety. The hot gases that result from arc faults can be conducted out of the switchgear building through the duct.

Depending on the type of switchgear panel, you can alternatively use an arc absorber or a deflector plate to release the pressure.

# Electrotechnical Solutions under one Roof

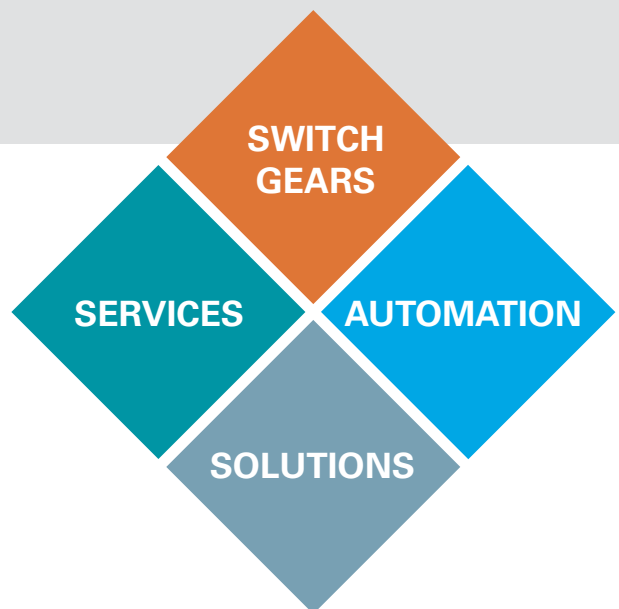
NATUS products and services

**SWITCHEARS** For decades we have been setting standards in innovation, safety and quality in our core business of switchgear systems.

**SERVICES** Our comprehensive service package leaves no wish unanswered – we do everything from assembly to maintenance and a 24-hour emergency service, right through to a comprehensive spare parts service.

**AUTOMATION** We are constantly developing reliable solutions that are specifically tailored to customers' needs in the field of automation and control systems.

**SOLUTIONS** We combine the products of selected partners with NATUS services and a comprehensive project management to come up with professional solutions.



**NATUS** GmbH & Co. KG  
Industriegelände Nord  
Loebstraße 12, 54292 Trier, Germany  
Postfach 2960, 54219 Trier, Germany  
Tel.: +49 (0)651-1449-0, Fax: +49 (0)651-21600  
E-Mail: [office@natus.de](mailto:office@natus.de), [www.natus.de](http://www.natus.de)