Medium Voltage Distribution

NEX

24 kV

Withdrawable vacuum Circuit-breaker

Catalogue

Partner licensed
by
Schneider Electric

Manufactured by :

PT. TRIAS INDRA SAPUTRA

Sentra Industri Terpadu Pantai Indah Kapuk, Jl. Dokter Kamal Muara VII Blok A No. 6 Jakarta 14470
Telp.+62-21 5552989, Fax.+62-21 6198571/6195812
Website : www.TriasIndraSaputra.com, Email : Info@TriasIndraSaputra.com

General Contents

Presentation

Field of Application

PE57990

For over 45 years, Schneider Electric has provided medium voltage electrical network protection, monitoring and control solutions in the public distribution, industry and building sectors.

NEX 24 units 24 kV switchboard

NEX 24 is indoor, metal-enclosed switchgear designed for the MV section of HV/MV and MV/MV substations.
NEX 24 is a medium voltage equipment comprising cubicles with breaking devices, sensors, medium voltage connections and auxiliaries.

For all your applications :

- industrial substations
- infrastructure supply substations.

NEX 24 offers you:

- flexible and adapted solutions
- the experience of a major electrical manufacturer
- dedicated engineering.

PE57987

PE56222

PE57995

An enhanced offer with vacuum type switchgear

The NEX 24 offer is further enhanced to include a vacuum type circuit-breaker (Evolis range).
This switchgear offers you:

- high mechanical and electrical endurance
- a comprehensive range of performance levels
- optimal operating safety
- environmental protection.

Continuity of service and complete safety


PE57997

NEX 24 is solidly based on extensive experience acquired throughout the world and provides your networks with a high level of dependability and safety.

NEX 24 integrates a host of innovative solutions designed around proven techniques: high performance switchgear, digital protection, monitoring and control systems, enclosures capable of withstanding internal arcing.

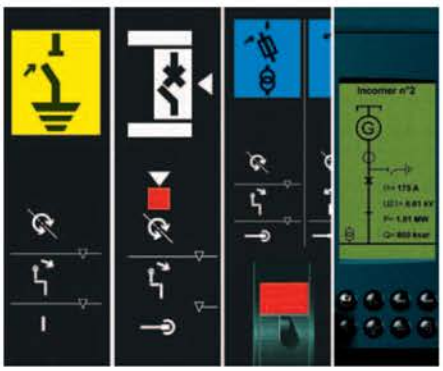
From its very conception, NEX 24 has taken account of three key user requirements:

Reliability

- type testing was carried out for each performance level in the NEX 24 range.
- the design, manufacturing and testing of NEX 24 was carried out according to ISO 9001: 2000 quality standard.
- three-dimensional computer modeling techniques were used to study the electrical fields.

Simplicity

- a user interface which is easily understood by everybody.
- interlocks and padlocks preventing operator errors.
- Sepam-type protection units enabling on-site information retrieval without any additional devices.
- maintenance limited to simple, routine operating checks and cleaning and greasing every 5 to 10 years.
- easy installation due to identical civil engineering dimensions for all cubicles and installation being possible against a wall.


PE56386

Safety

- operations are all performed from the front, including access to connections and busbars.
- racking in and out is only possible with the door closed.
- the power-on indicator is situated on the front of the functional unit.
- the earthing switch has making capacity.
- one single “anti-reflex” handle is used for all NEX 24 operations.
- internal arc withstand developed for all functional units.

NEX 24,
a comprehensive solution

PE57021

NEX 24 provides the most efficient means to control and protect a wide range of applications.
Due to the devices it comprises, NEX 24 can be easily integrated into a monitoring and control system.

Sepam protection and control units

Sepam series 20, series 40 and series 80 digital protection relays take full advantage of Schneider Electric experience in electrical network protection.
Sepam series 20, series 40 and series 80 provides all the necessary functions:

- effective protection of people and property
- accurate measurements and detailed diagnosis
- integral equipment control
- local or remote indication and operation.

Easy evolution

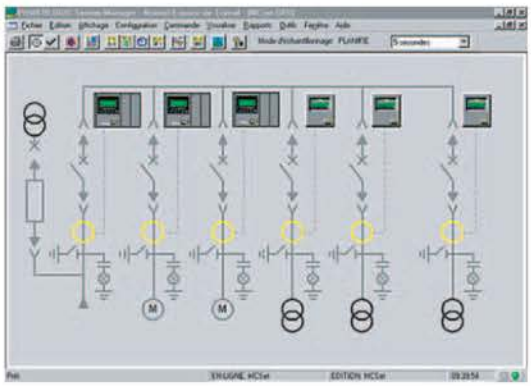
Addition of communication, digital I/O's, analog output, or temperature acquisition are possible due to its modular design.

PE57123

PowerMeter and Circuit Monitor metering units

The PowerLogic PowerMeter replaces a full complement of basic analog meters. This cost effective, high performance meter provides a full complement of accurate true-rms metering values.
The PowerLogic series 3000/4000 Circuit Monitor is designed for critical power users and large energy consumers, to provide the information needed to confidently enter the evolving world of deregulation.
It can be adapted to meter almost any time-of-use or real-time rate.

MT20055



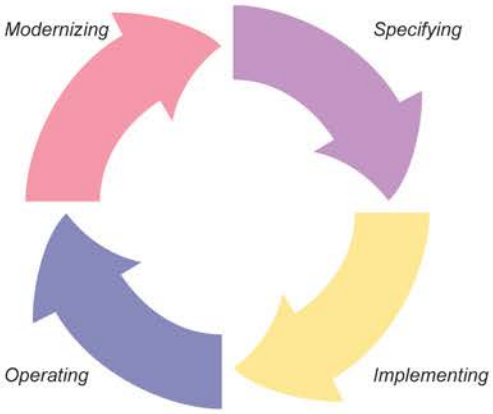
Monitoring and control

NEX 24 can be easily:

- integrated into an existing monitoring and control system: communication of Sepam digital relay or PowerMeter/Circuit Monitor metering device through a standard protocol (Modbus)
- integrated into a SMS PowerLogic electrical installation monitoring system.

NEX 24, a comprehensive solution (cont.)

MT20064



Schneider Electric Services, by your side throughout the life of your installation

Specifying

We help you to define your solutions: selection guide, technical assistance, advice…

Implementing

We oversee the completion and commissioning of your installation: design, cost optimization, guaranteed performances and dependability, commissioning tests, etc.

Operating

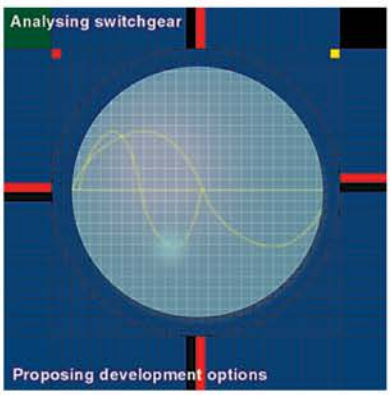
We help run your daily operations in real time: maintenance contract, technical assistance, supply of replacement parts, corrective and preventive maintenance, operation and maintenance training, etc.

Modernizing

We can bring the performance of your installation up to date: installation audit, switchgear diagnosis, adaptation and modification, end of life recycling, etc.

Examples of services provided

MT20065EN



Warranty extension
A warranty extension is proposed if your installation is checked by ourselves before being commissioned.

Circuit-breaker-contactor diagnosis
Throughout the life of the equipment, it is possible to carry out routine measurement of its characteristics in order to optimize maintenance. This service may be part of a global installation maintenance contract.

End-of-life recycling
Schneider Electric Services has an operational subsidiary allowing you to recycle your medium voltage switchgear.

Quality assurance-Environment

PE40039

Certified quality : ISO 9001

A major asset

In each of its units, Schneider Electric integrates a functional organization whose main role is to check quality and monitor compliance with standards. This procedure is:

- uniform throughout all departments
- recognized by many customers and approved organizations.

But above all, it is its strict application that has allowed us to obtain the recognition of an independent organization:
The **F**rench **Q**uality **A**ssurance **A**ssociation (AFAQ).
The quality system for the design and manufacture of NEX 24 is certified to be in conformity with the requirements of ISO 9001: 2000 quality assurance standard.

PE57989

Strict and systematic checks

During manufacture, each NEX 24 functional unit is subject to systematic routine testing with the aim of checking the quality and conformity of the following features:

- measuring of opening and closing speeds
- measuring of operating torque
- dielectric test
- testing of safety systems and interlocks
- testing of low voltage components
- conformity with drawings and diagrams.

The results obtained are recorded and approved by the quality control department on each device's test certificate.

This therefore guarantees product traceability.

Control of vacuum interrupters

Each vacuum interrupter, sealed and airtight, is checked for the quality of the vacuum obtained. This pressure measurement is based on the proven "magnetron discharge" method.

Using this sophisticated procedure, measurement is very precise and does not require access to the inside of the bulb, thus not affecting the airtight seal.

PE56733

Protected environment

As part of the group's environmental policy, Schneider Electric Services provides you with an operational subsidiary to recover medium voltage switchgear and thus eliminate any discharge to atmosphere.

In order to help you protect the environment and to relieve you of any concerns in terms of stock or dismantling, Schneider Electric Services offers to take back your equipment at the end of its life.

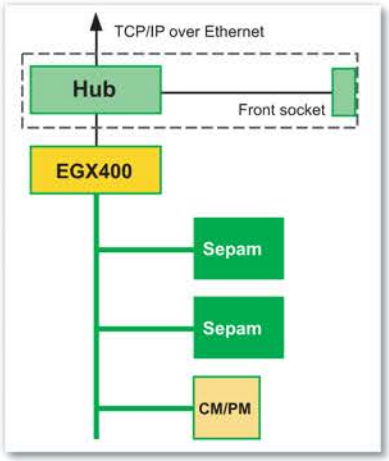
NEX 24 has been designed with environmental protection in mind:

- the materials used, insulators and conductors are identified, easily separable and recyclable.
- the SF6 can be recovered at the end of the equipment's life and reused after treatment.
- production sites are certified to ISO 14001.

Web Remote Monitoring

NEX 24 switchboards integrate Web technologies so that you can find out information about your electrical installation as easy as opening a Web page.
All you need is a standard Web browser and a PC connected to your local area network.

DE57492EN



NEX 24 switchboard

Simple Choice

A simple choice between WRM-1 and WRM-2 service levels allows you to easily order your Web Remote Monitoring NEX 24 switchboard.
A customized level is also available.
Your Web Remote Monitoring NEX 24 switchboard comes equipped with a Web server including Web pages dedicated to power equipment data.

Easy commissioning

Web Remote Monitoring equipment is delivered ready to connect and commission.
A Quick Start guide, packaged with your switchboard, provides three easy-to-follow steps.

PE57471

PE57472

PE57473

Functionalities provided

	WRM-1	WRM-2
Instantaneous readings Displays automatically updated meter values	■	■
Circuit summary Displays the RMS current 3-phase average (A), the real power (kW), the power factor, the circuit breaker status (if applicable), etc.	■	■
Load current summary Displays the current RMS value for each phase (A), for all circuits	■	■
Demand current summary Displays the average demand current value for each phase (A), for all circuits	■	■
Power summary Displays the present demand (kW), the peak demand (kW) and the times and dates of the records	■	■
Energy summary Displays the energy (kWh) the reactive energy (kvarh), and the times and dates of the records	■	■
Instantaneous readings, all devices **Basic historical data logging, energy and trending** Displays automatically updated meter values for all the communicating devices in the equipment		■
Log displays Displays data as time curves, or tables		■
Export of data tables Allows data tables to be exported in a standard Windows format		■

A Few references

PE57982

PE57985

PE57984

PE57981

PE57983

Energy and Insfrastructures

■ Electrical Energy	
Torminäe power distribution centre	*Estonia*
Rotermann power distribution	*Estonia*
Northern Area Rural Power Distribution	*Vietnam*
NDPL	*India*
Power Company No.3 (EVN)	*Vietnam*
Lattakia Port Substation	*Syria*
■ Airports	
Tartu Airport	*Estonia*
New Sir Sereste Khama Airport	*Gaberone*
Delhi International Airport	*India*
New Bangkok International Airport	*Thailand*
■ Oil and gas	
Oil Distribution Pump	*Vietnam*
VKG Ojamaa oil processing facilities	*Estonia*
AUDEX Pte Ltd	*Indonesia*
Otway, Port Campbell offshore gas extraction	*Australia*
Oil refinery Empresa	*Colombia*
Technip Qatargas	*Qatar*
Bandar Abbas Gas Condensate Refinery	*Iran*
■ Water	
St Helens Rock pumping station for KZN Umgeni Water	*South Africa*
Bendigo Water Pumping Station	*Australia*
Hyflux Water Desalination Plant	*Singapore*
Pumping water station Bir Hal Hacham	*Syria*

Industry

■ Automative	
Toyota	*South Africa*
■ Mining, Minerals and Metals	
Dong Banh Cement Plant	*Vietnam*
Thaï Nguyen Cement Plant	*Vietnam*
Afrisam Cement Plants	*South Africa*
Lafarge Cement Plant	*South Africa*
Mopani Copper Mines	*Zambia*
Luita Cobolt	*Democratic Republic of Congo*
Ruashi Mines	*Democratic Republic of Congo*
Total Coal Tumelo Project	*South Africa*
North Mara Gold Mine	*Tanzania*
■ Food and beverages	
Early Bird farms	*South Africa*
Hulets Sugar Refinery	*South Africa*

Buildings

■ Offices	
IOB Bank	*India*
■ Retail	
Real Hypermarket	*Russia*
■ Hotels	
Le Meridian	*India*
■ Industrial buildings	
Pertamina Office Complex	*Indonesia*
Coca Cola	*South Africa*
St Gobain - Chennai	*India*
Intel A9/T9 Project	*Vietnam*
■ Hospital	
Livingston Hospital - Port Elizabeth	*South Africa*

NEX 24 kV Licensed Partner

PT. Trias Indra Saputra is a well established national manufacturer of Electrical Switchboard since 1987.

For many years, PT. Trias Indra Saputra has been involved in many prestigious projects by providing Top Quality Electrical Switchboard and Cable Management Solutions Products and Services

PT. Trias Indra Saputra is committed to providing the best solutions for our clients and has been in partnership with Schneider Electric to meet the needs of our clients for many years.

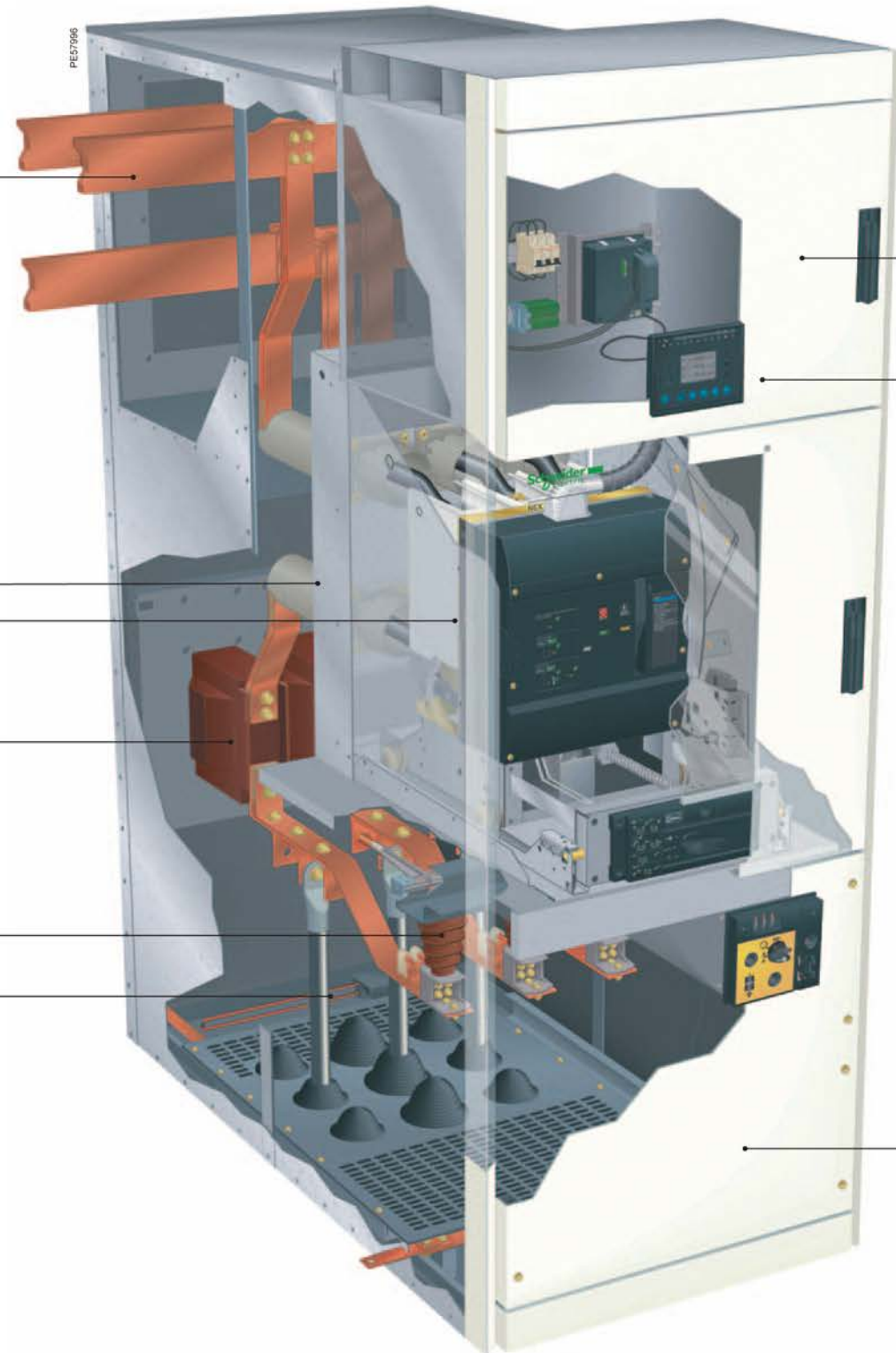
In 2010, PT Trias Indra Saputra take this partnership into higher level by undertaking the license to manufacture Schneider NEX 24 KV Switchgear.

And by doing so, created an added values for our clients as we are now able to provide another top quality products in colabration with an well established name Schneider Electric

This is our Continuous efforts as we strive to improve to give the best products and services to our valued customers.

General

Description



Description (cont.)

Make up of a NEX 24 switchboard

NEX 24 switchboards are made up of several interconnected functional units.
Power connections are made between functional units within a switchboard via a single busbar.
The electrical continuity of all metal frames is provided by the connection of each functional unit's earthing busbar to the switchboard's main earthing circuit.
Low voltage wiring trays are provided in the switchboard above the LV control cabinets.
LV cables can enter the switchboard through the top or bottom of each functional unit.

Description of a functional unit

A functional unit comprises all equipment in the main and auxiliary circuits which together provide a protection function. Each functional unit combines all the components which are required to fulfil this function:
- the cubicle
- the protection, monitoring and control system
- the withdrawable part.

The cubicle

LSC2B
(Loss of Service Continuity IEC 62271-200): this category defines the possibility of keeping other compartments energised (in service) when opening a main circuit compartment.

The cubicle is of LSC2B (Loss of Service Continuity category) type as defined by IEC standard 62271-200. The medium voltage parts are compartmented using metallic partitions and shutters which are connected to earth and which separate:
- the busbars
- the withdrawable part (circuit-breaker, disconnector truck or earthing truck)
- MV connections, earthing switch, current sensors and voltage transformers as required.

NEX 24 guarantees a high level of protection of people; when a compartment containing a main circuit is open, the other compartments and/or functional units may remain energised.
The low voltage auxiliaries and monitoring unit are in a control cabinet separated from the medium voltage section.
Seven basic cubicle layouts are offered:

■ Incomer or Feeder	**IF**
■ Incomer Direct to busbar	**ID**
■ Bus Coupler	**BC**
■ Bus Riser Fixed	**RF**
■ Bus Riser Withdrawable	**RW**
■ Busbar Metering	**BM**
■ Switch	**LB**

IF and BC cubicles have withdrawable circuit-breaker.
RW has withdrawable link truck.

The protection, monitoring and control system

This includes:
- voltage transformers
- Sepam, protection, monitoring and control unit
- current sensors, which may be of 2 types:
  - conventional current transformers (DIN)
  - LPCT (Low Power Current Transducer).

The withdrawable part

This includes:
- the circuit-breaker, the earthing truck with its closing and opening mechanism, or the disconnector truck
- the lever-type propulsion mechanism for racking in-out
- interlocks to fix the withdrawable part on the fixed part either in service position or disconnected.

Technical characteristic

PE57999

IAC (internal arc classification):
The metal enclosed switchgear may have different types of accessibility on the various sides of its enclosure.
For identify purpose of different sides of the enclosure, the following code shall be used (according to IEC 62271-200 standard).
A: restricted access to authorized personnel only
F: access to the front side
L: access to the lateral side
R: access to the rear side.

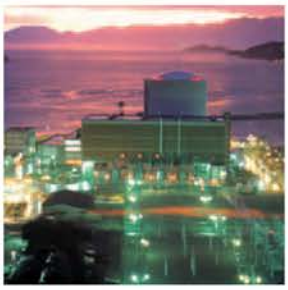
Technical data

Rated voltage			
		(kV)	**24**
Rated insulation level			
Power frequency withstand voltage 50 Hz - 1 min		(rms kV)	50
Lightning impulse withstand voltage 1.2/50 µs		(kV peak)	125
Nominal current and maximum short time withstand current (1)			
Functional unit with circuit-breaker			
Short time withstand current	Ith. max	(kA/3 s)	16
			25
Rated current	In max busbars	(A)	2000
	In CB	(A)	630
			1250
			2000
Functional unit with load break switch (LB cubicle)			
Short time withstand current	Ith. max	(kA)	25
Rated current	In max ⩽	(A)	630
Internal arc withstand			
IAC-AFLR		(kA/1 s)	25
Protection degree			
			IP3X or IP4X external IP2X internal between compartments

(1) For functional units equipped with circuit-breakers or fuse-contactors, the breaking capacity is equal to the short time withstand current. In all cases, the device peak making capacity is equal to 2.5 times the short time withstand current.

Operating conditions

PE57991



PE57988

Operating conditions

Normal operating conditions, according to IEC 62271-1 for indoor switchgear
■ Ambient air temperature:
□ less than or equal to 40°C
□ less than or equal to 35°C on average over 24 hours
□ greater than or equal to –5°C.
■ Altitude:
□ less than or equal to 1000 m
□ above 1000 m, a derating coefficient is applied (please consult us).
■ Atmosphere:
□ no dust, smoke or corrosive or inflammable gas and vapor, or salt (clean industrial air).
■ Humidity:
□ average relative humidity over a 24 hour period ⩽ 95%
□ average relative humidity over a 1 month period ⩽ 90%
□ average vapor pressure over a 24 hour period ⩽ 2.2 kPa
□ average vapor pressure over a 1 month period ⩽ 1.8 kPa.

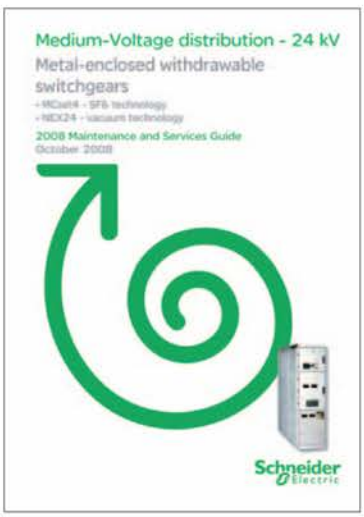
Specific operating conditions (please consult us)
NEX 24 has been developed to meet the following specific conditions:
■ temperature (possible derating)
■ corrosive atmospheres, vibrations, (possible adaptation).

Storage conditions
In order to retain all of the functional unit's qualities when stored for prolonged periods, we recommend that the equipment is stored in its original packaging, in dry conditions sheltered from the sun and rain at a temperature of between –25°C and +55°C.

Standards

The NEX 24 range meets the following international standards:
■ IEC 62271-1: clauses common to high voltage switchgear
■ IEC 62271-100: high voltage alternating current circuit-breakers
■ IEC 62271-102: alternating current disconnectors and earthing switches
■ IEC 62271-103: switches for rated voltages above 1 and less than 52 kV
■ IEC 62271-200: metal-enclosed switchgear for alternating current at rated voltages of between 1 and 52 kV
■ IEC 60282-2: high voltage fuses
■ IEC 60255: measurement relay and protection unit
■ IEC 60044-1: current transformers
■ IEC 60044-2: voltage transformers
■ IEC 60529 : defining the protection indices provided by the enclosures
■ IEC 61958: Voltage Presence Indicating Systems (High Voltage prefabricated switchgear and controlgear assemblies).

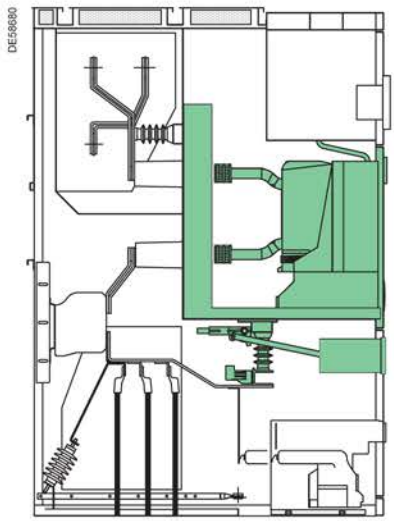
PE58000



Services provided: help with preventive maintenance

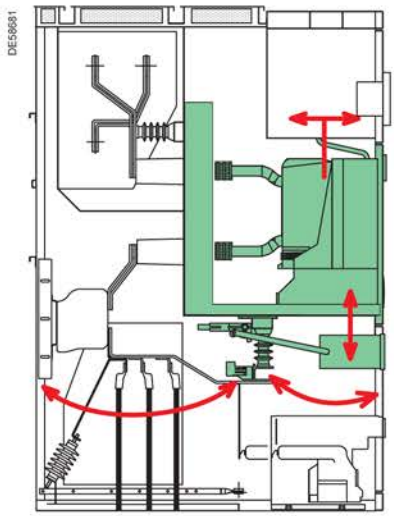
NEX 24 Maintenance & Services Guide is available and gives the most important general instructions for:
■ reducing equipment wear and tear (and/or failure)
■ ensuring that the equipment is safe during all installation, repair and servicing operations.
In the pages of this guide, all the information needed for:
■ operations on: switchgear, removable devices, control mechanisms, insulating materials and vents, power circuits and control, and indication auxiliaries.
■ recommended frequency according to operating conditions: normal or corrosive atmospheres.

Main functions



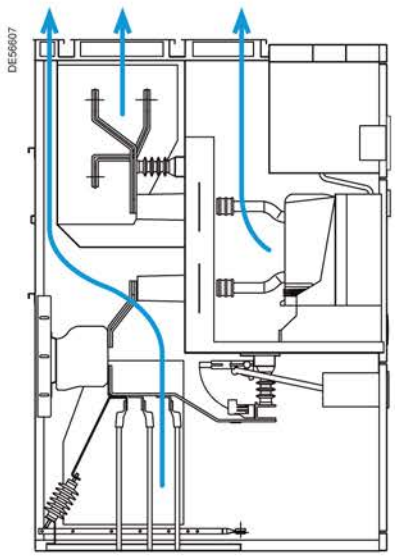
withdrawable unit and earthing

Composed of:
- withdrawable circuit-breaker,
- complete cradle equipped with metallic safety shutters and dedicated bushings,
- earthing switch with making capacity,
- LV connector between LV control cabinet and CB auxiliaries.



Interlocking

The cubicle integrates the different interlocking to prevent incorrect operation by the operator.
NEX secures operation to:
- access the cable compartment,
- rack in and out,
- operate the earthing switch,
- open the CB door.

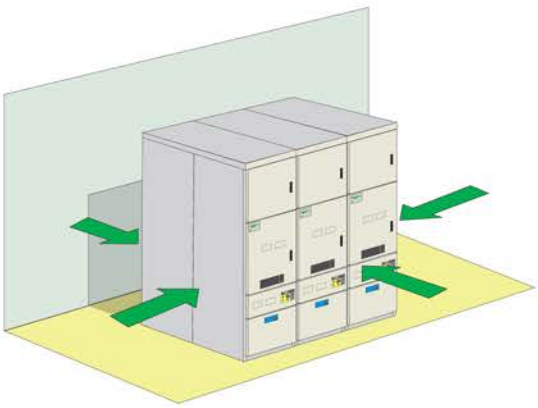


Safety

- General structure that allows gas evacuation through pressure relief flaps.
- Each compartment is designed with a specific chimney for upward gas evacuation.

Protection of people

DE59690



NEX 24 internal arc

NEX 24 is designed to withstand and protect operators in the case of failure due to an internal arc.
NEX 24 has been successfully tested using type tests.

4-sided internal arc protection
A NEX 24 switchboard is installed in the middle of a room.
Internal arc protection on 4 sides is necessary in order to protect an operator who goes behind the cubicle.

Internal arc version
NEX 24 is designed to withstand and protect operators in the case of failure due to an internal arc.
NEX 24 has been successfully tested using type tests.
Protection against internal arcing is available on 25 kA ratings.
NEX 24 proposes one option to install an internal arc switchboard.
■ 4-sided internal arc protection
In the case of a NEX 24 switchboard installed in the middle of a room, internal arc protection on 4 sides is necessary in order to protect an operator who goes behind the cubicle.
■ Installation in a room with ceiling height > 4 m
■ Internal arcing detector
NEX 24 has 2 systems that can detect internal arcing and switch off the power supply so as to limit the fault duration.
□ electromechanical detector
This system employs a positive security electromechanical tripping circuit, positioned on the cubicle roof flaps.
This set transmits the information to the Sepam to give the opening order to the circuit-breaker located upstream of the fault.
□ optic detector (VAMP system): please contact us
Internal arcing is detected by optical sensors which will measure the light caused by the initiation of arcing. Based on this information, an electronic module, after processing the information, will give the opening order to the circuit-breaker located upstream of the fault.

PE57120

Dependable mechanical control devices

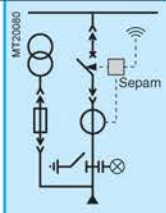
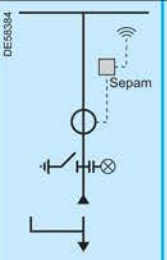
All operations are carried out from the front face.
The user is guided through icon-diagrams on each front panel making it easy to understand the operating sequence and device status. Interlocks and padlocks prevent operator errors.
Several additional levels of security also protect operators:
■ racking in and out is only possible with the door closed.
■ the very extensive set of mechanical and electrical interlocks do not allow operator error. These can be added to by key locks or padlocks according to specific operating procedures. Each selector can be fitted with one to three padlocks.
■ all operations are carried out from the front face.
■ the voltage present indicator is located on the front face of the functional unit, in the immediate vicinity of the earthing switch control.
■ disarming of circuit-breaker when racking out. This function enables the circuit-breaker control springs to be disarmed during the extraction operation.

Cubicle description

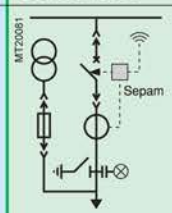
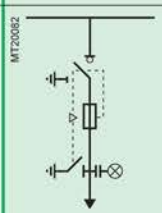
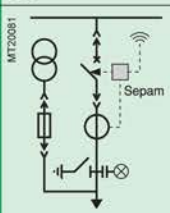
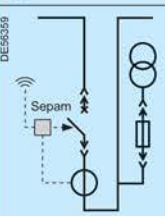
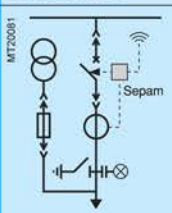
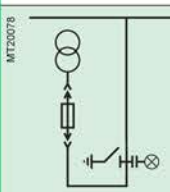
Choice of functional units

The NEX 24 range comprises **11 functional applications**.
The table below can be used to link requirements to functional units and gives basic information on the general composition of each unit.

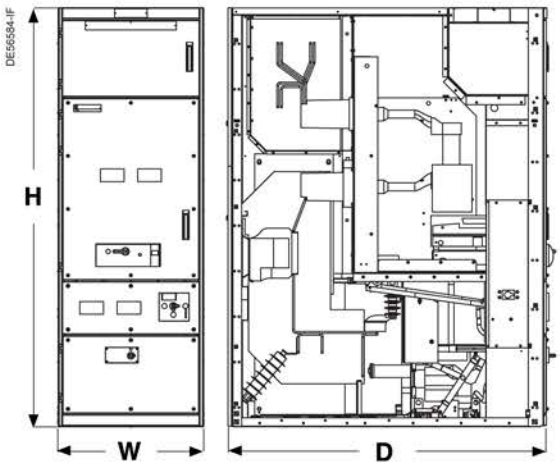
Selection guide
You want to supply power to a transformer.
The chosen solution is a **transformer feeder/breaker**.
The corresponding **functional unit** will therefore be a **TF-B**,
comprising a cubicle equipped with a withdrawable **circuit-breaker**,
and **transformer application Sepam.**

Function	**Incomer**				
	Line	Transformer	Generator		
Functional unit	**LI-B**	**TI-B**	**GI-B**	**LI**	
Cubicle	IF	IF	IF	ID	
Device	Circuit-breaker	Circuit-breaker	Circuit-breaker	–	
Sepam protection relay series 20	Substation S20	Transformer T20	Generator	–	
series 40	S40, S41, S42	T40, T42	G40		
series 80	S80, S81, S82	T81, T82, T87	G82, G88, G87		
Single line diagrams					

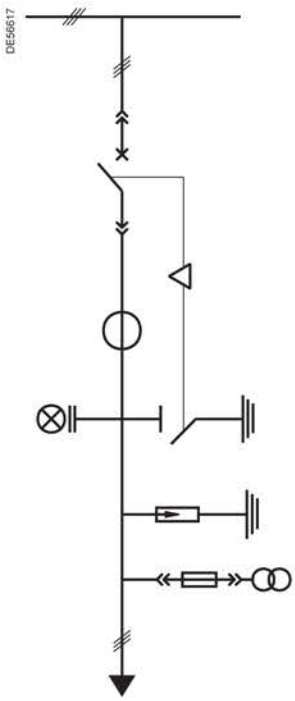
Choice of functional units (cont.)

	Feeder				Bussectioning		Metering and busbar earthing
	Line	Transformer	Transformer	Capacitor	Switchboard	Substation	
	LF-B	**TF-B**	**TF-S**	**CB-B**	**BS-B**	**SS-B**	**BB-V**
	IF	IF	LB	IF	BC and RF (or RW)	IF	BM
	Circuit-breaker	Circuit-breaker	Fuse-switch	Circuit-breaker	Circuit-breaker	Circuit-breaker	
	Substation S20 S40, S41, S42 S80, S81, S82	Transformer T20 T40, T42 T81, T82, T87	Transformer T20 T40, T42	Capacitor C86	Busbar B21, B22 B83	Substation S20 S40, S41, S42 S80, S81, S82	
							

IF
Incomer and Feeder



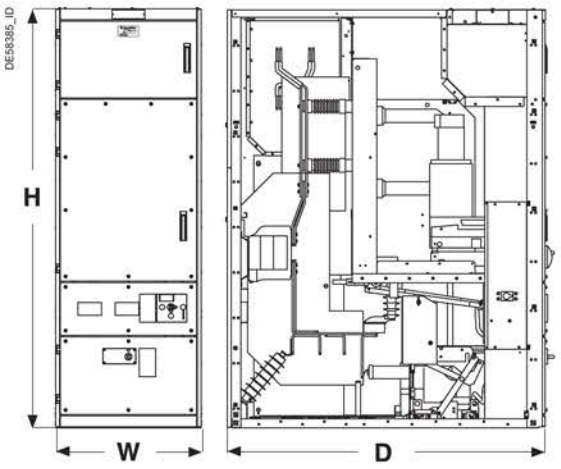
Rated voltage	(kV)							
			24					
Rated insulation level								
Power frequency withstand voltage 50 Hz - 1 min (rms kV)			50					
Lightning impulse withstand voltage 1.2/50 µs (kV peak)			125					
Rated current	(A)	630	■		■			
		1250		■		■		
		2000					■	■
Breaking capacity	(kA)	16	■	■			■	
		25			■	■		■
Short time withstand current	(kA/3 s)	16	■	■			■	
		25			■	■		■
Dimensions	(mm)							
Width (W)			800	800	800	800	1000	1000
Height (H)			2300					
Depth (D)			1750					



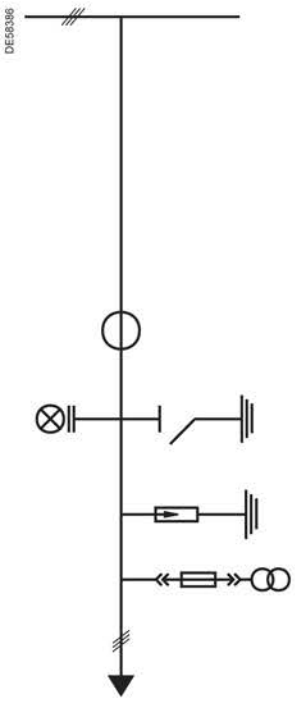
Functions

- ■ **Low voltage cabinet**
- ■ **Circuit-breaker**
  - □ Evolis range - vacuum technology
- ■ **Voltage transformers**
  - □ fused withdrawable
  - □ fused fixed
- ■ **Earthing switch**
- ■ **Voltage Presence Indication (VPIS)**
- ■ **MV cables connection**
  - □ bottom entry
  - □ top entry
- ■ **Current transformers**
  - □ 3 MV type
  - □ LPCT
- ■ **Surge arresters**
- ■ **Anticondensation heaters**

ID
Incomer Direct to busbar



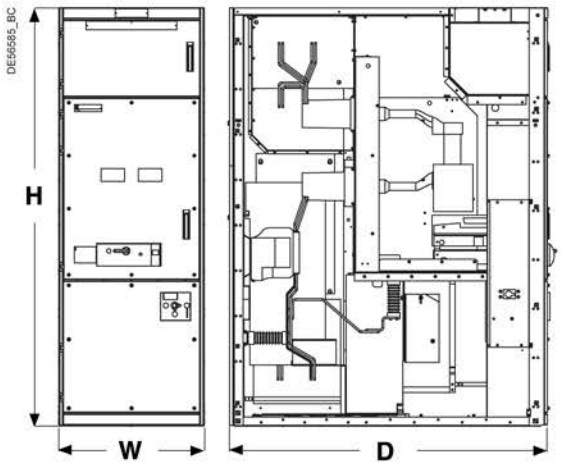
Rated voltage	(kV)			
			24	
Rated insulation level				
Power frequency withstand voltage 50 Hz - 1 min (rms kV)			50	
Lightning impulse withstand voltage 1.2/50 µs (kV peak)			125	
Rated current	(A)	1250	■	
		2000		■
Short time withstand current	(kA/3 s)	25	■	■
Dimensions	(mm)			
Width (W)			800	1000
Height (H)			2300	
Depth (D)			1750	



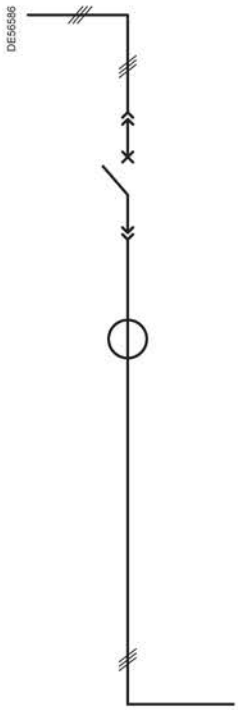
Functions

- ■ **Low voltage cabinet**
- ■ **Voltage transformers**
  - □ fused withdrawable
  - □ fused fixed
- ■ **Earthing switch**
- ■ **Voltage Presence Indication (VPIS)**
- ■ **MV cables connection**
  - □ bottom entry
  - □ top entry (please consult us)
- ■ **Current transformers**
  - □ 3 MV type
- ■ **Surge arresters**
- ■ **Anticondensation heaters**

BC
Bus Coupler



Rated voltage	(kV)					
			24			
Rated insulation level						
Power frequency withstand voltage 50 Hz - 1 min (rms kV)			50			
Lightning impulse withstand voltage 1.2/50 µs (kV peak)			125			
Rated current	(A)	1250	■	■		
		2000			■	■
Breaking capacity	(kA)	16	■		■	
		25		■		■
Short time withstand current	(kA/3 s)	16	■		■	
		25		■		■
Dimensions	(mm)					
Width (W)			800	800	1000	1000
Height (H)			2300			
Depth (D)			1750			

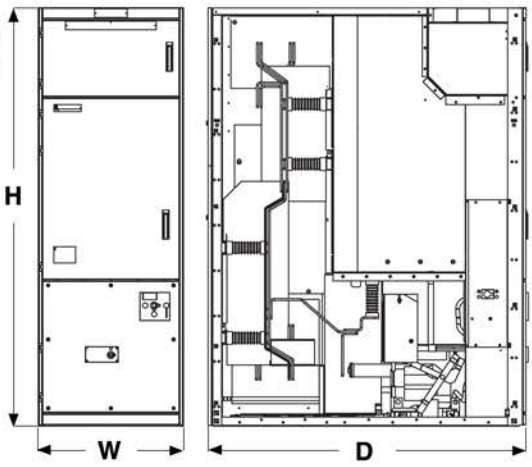


Functions

- ■ **Low voltage cabinet**
- ■ **Circuit-breaker**
  - □ Evolis range
- ■ **Voltage Presence Indication (VPIS)**
- ■ **Current transformers**
  - □ 3 MV type
  - □ LPCT
- ■ **Anticondensation heaters**

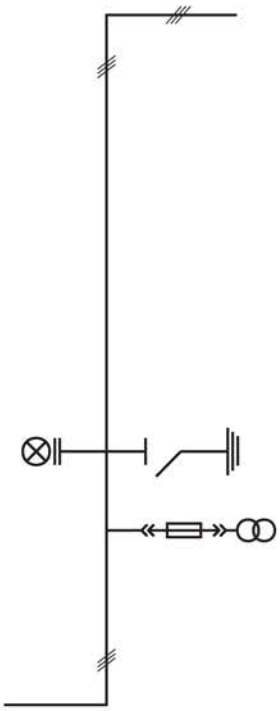
RF
Bus Riser Fixed

DE56587_RF



Rated voltage	(kV)					
			24			
Rated insulation level						
Power frequency withstand voltage 50 Hz - 1 min (rms kV)			50			
Lightning impulse withstand voltage 1.2/50 µs (kV peak)			125			
Rated current	(A)	1250	■	■		
		2000			■	■
Short time withstand current	(kA/3 s)	16	■		■	
		25		■		■
Dimensions	(mm)					
Width (W)			800	800	800	800
Height (H)			2300			
Depth (D)			1750			

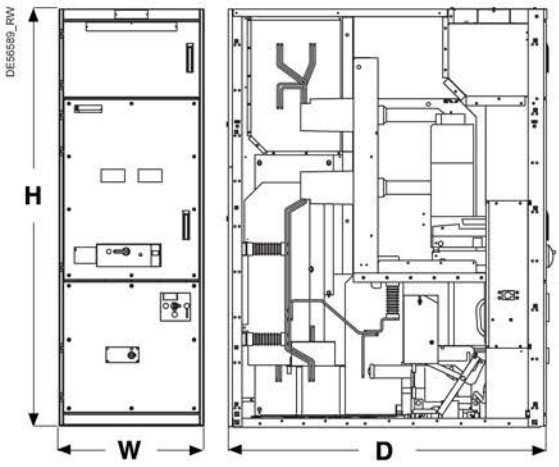
DE58387



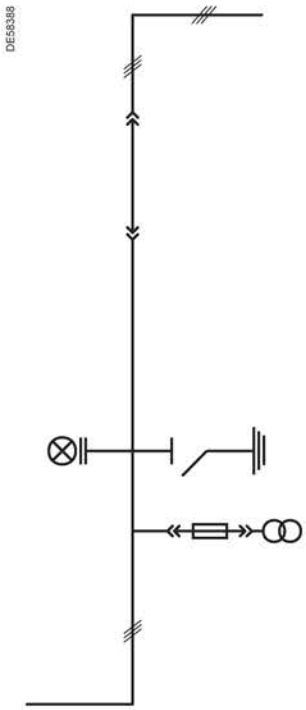
Functions

- ■ **Low voltage cabinet**
- ■ **Voltage transformers**
  - □ fused withdrawable
  - □ fused fixed
- ■ **Anticondensation heaters**
- ■ **Earthing switch**
- ■ **Voltage Presence Indication (VPIS)**

RW
Bus Riser Withdrawable



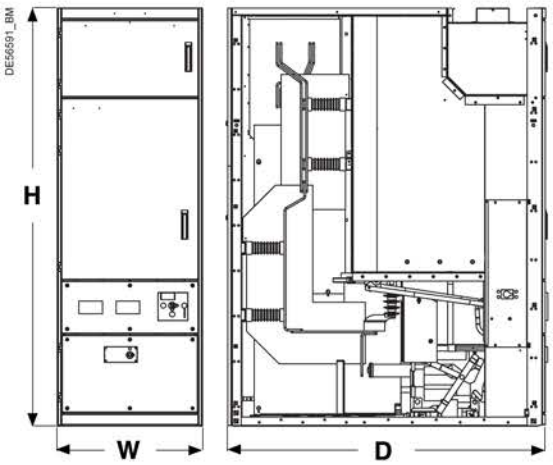
Rated voltage	(kV)					
			24			
Rated insulation level						
Power frequency withstand voltage 50 Hz - 1 min (rms kV)			50			
Lightning impulse withstand voltage 1.2/50 µs (kV peak)			125			
Rated current	(A)	1250	■	■		
		2000			■	■
Short time withstand current	(kA/3 s)	16	■		■	
		25		■		■
Dimensions	(mm)					
Width (W)			800	800	1000	1000
Height (H)			2300			
Depth (D)			1750			



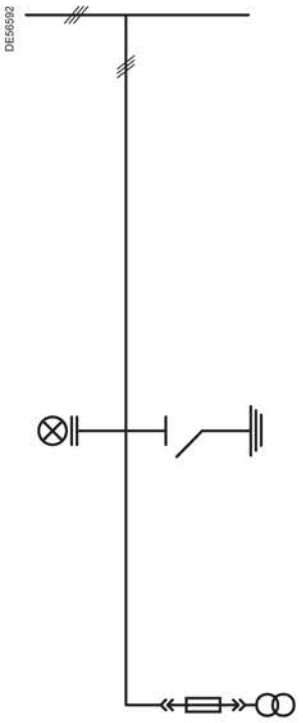
Functions

- ■ **Low voltage cabinet**
- ■ **Withdrawable link truck**
- ■ **Voltage transformers**
  - □ fused withdrawable
  - □ fused fixed
- ■ **Anticondensation heaters**
- ■ **Earthing switch**
- ■ **Voltage Presence Indication (VPIS)**

BM
Busbar Metering



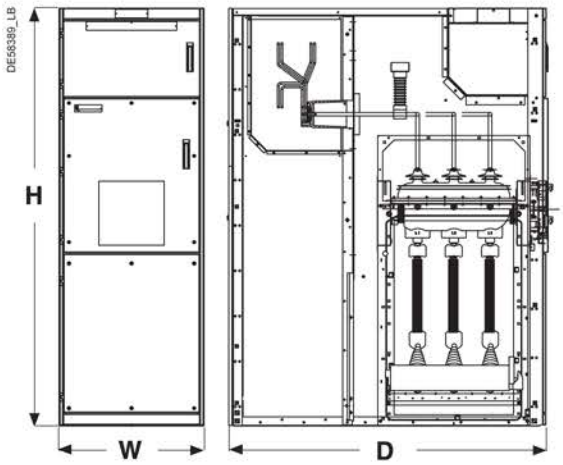
Rated voltage	(kV)		
			24
Rated insulation level			
Power frequency withstand voltage 50 Hz - 1 min (rms kV)			50
Lightning impulse withstand voltage 1.2/50 µs (kV peak)			125
Rated current	(A)	1250	■
		2000	■
Short time withstand current	(kA/3 s)	16	■
		25	■
Dimensions	(mm)		
Width (W)			800
Height (H)			2300
Depth (D)			1750



Functions

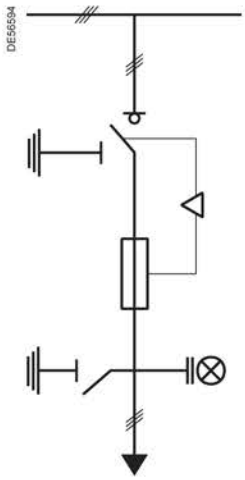
- ■ **Low voltage cabinet**
- ■ **Voltage transformers**
  - □ fused withdrawable
  - □ fused fixed
- ■ **Earthing switch**
- ■ **Voltage Presence Indication (VPIS)**
- ■ **Anticondensation heaters**

LB
QM Fuse Switch feeder



Rated voltage	(kV)		
			24
Rated insulation level			
Power frequency withstand voltage 50 Hz - 1 min (rms kV)			50
Lightning impulse withstand voltage 1.2/50 µs (kV peak)			125
Breaking capacity (1)	(kA)	25	■
Short time withstand current (1)	(kA/1 s)	25	■
Dimensions	(mm)		
Width (W)			800
Height (H)			2300
Depth (D)			1750

(1) Limited by fuses



Functions

- ■ **Low voltage cabinet**
- ■ **Switch**
  □ SM6 type SF6 technology
- ■ **Earthing switch** (integrated to the switch)
- ■ **Voltage Presence Indication (VPIS)**
- ■ **MV cables connection**
  □ bottom entry
- ■ **Anticondensation heaters**

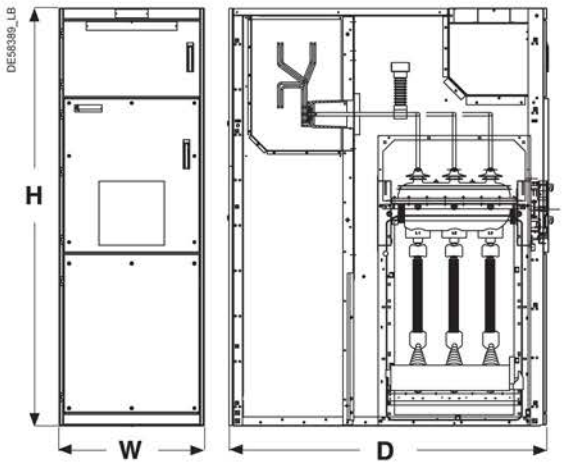
Optional accessories

- ■ **Motor for operating mechanism**
- ■ **Auxiliary contacts**
- ■ **Key-type interlocks**
- ■ **50 W heating element**

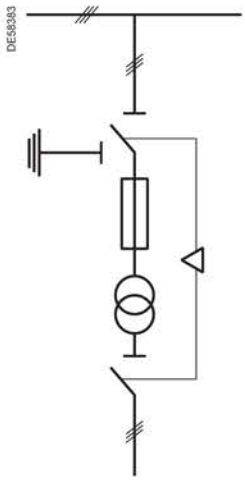
LB cubicles including a fuse switch are used to supply power and protect low power transformers.
E.g.: auxiliary service transformers in primary substations.
All operations are carried out from the front face, including access to connections and busbars.

All functional interlocks meet recommendations in IEC 62271-200:
■ the switch is only possible to close if the earthing switch is open and the connection access panel is in place;
■ closing of the earthing switch is only possible if the switch is open;
■ opening of the access panel to medium voltage connections and fuses is only possible of the earthing switches upstream and downstream of the fuses are closed;
■ the switch is locked in the open position when the access panel is taken off.
The Voltage Presence Indication (VPIS) is situated on the front face of the functional unit, integrated in the switch's control panel.

LB
IM Switch



Rated voltage	(kV)		
			24
Rated insulation level			
Power frequency withstand voltage 50 Hz - 1 min (rms kV)			50
Lightning impulse withstand voltage 1.2/50 µs (kV peak)			125
Rated current	(A)	50	■
Short time withstand current	(kA/1 s)	25	■
Dimensions	(mm)		
Width (W)			800
Height (H)			2300
Depth (D)			1750



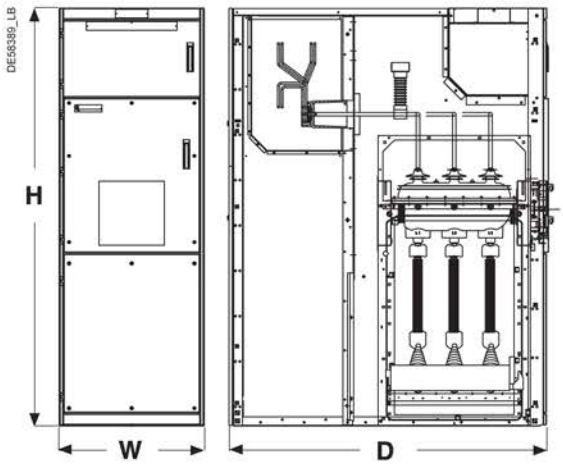
Functions

- ■ **Low voltage cabinet**
- ■ **disconnector**
  □ SM6 type SF6 technology
- ■ **Earthing switch** (integrated to the disconnector)
- ■ **MV cables connection**
  □ bottom entry
- ■ **three-phase busbars**
- ■ **Operating mechanism CS**
- ■ **Two 6.3 A fuses, UTE or DIN type**
- ■ **LV circuit isolating switch**
- ■ **One voltage transformer (phase-to-phase)**

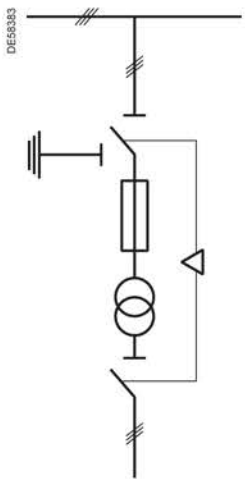
Optional accessories

- ■ **Mechanical indication system for blown fuses**
- ■ **Connection enclosure for cabling from above**

LB
TM MV/LV transformer unit for auxiliaries



Rated voltage	(kV)		
			24
Rated insulation level			
Power frequency withstand voltage 50 Hz - 1 min (rms kV)			50
Lightning impulse withstand voltage 1.2/50 µs (kV peak)			125
Rated current	(A)	50	■
Short time withstand current	(kA/1 s)	25	■
Dimensions	(mm)		
Width (W)			800
Height (H)			2300
Depth (D)			1750



Functions

- ■ **Low voltage cabinet**
- ■ **disconnector**
  - □ SM6 type SF6 technology
- ■ **Earthing switch** (integrated to the disconnector)
- ■ **MV cables connection**
  - □ bottom entry
- ■ **three-phase busbars**
- ■ **Operating mechanism CS**
- ■ **Two 6.3 A fuses, UTE or DIN type**
- ■ **LV circuit isolating switch**
- ■ **One voltage transformer (phase-to-phase)**

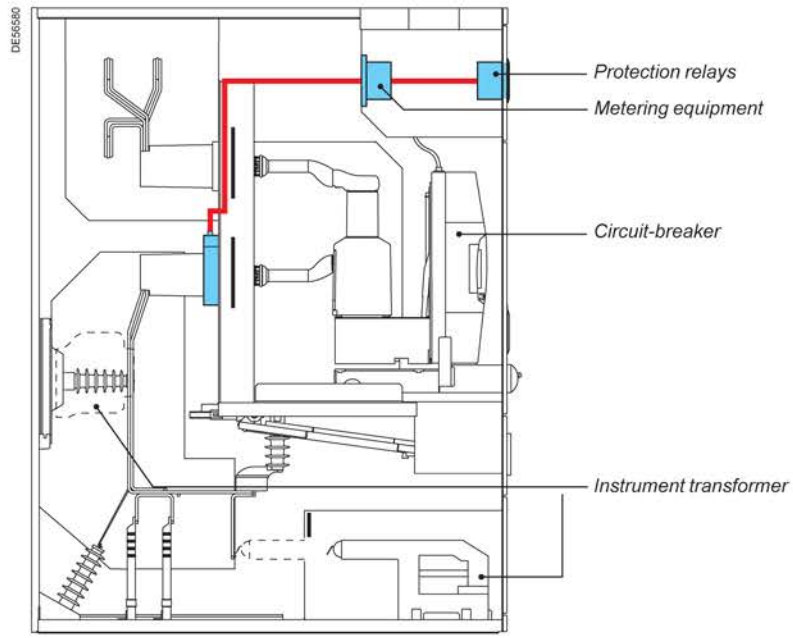
Optional accessories

- ■ **Mechanical indication system for blown fuses**
- ■ **Connection enclosure for cabling from above**

Protection, monitoring and control

Protection system
Sepam range

Each NEX functional unit can be equipped with a comprehensive protection, monitoring and control system comprising:
- instrument transformers to measure the necessary electrical values (phase current, residual current, voltages, etc.)
- protection relays, providing functions adapted to the part of the network to be protected
- metering equipment, to inform operators
- low voltage relaying, i.e. to provide control of the breaking device and of the withdrawable part
- various auxiliaries: secondary circuit test units, etc.




PE57021

Sepam: protection, monitoring and control units

Sepam, is a range of digital monitoring protection and control units.
Sepam is at the centre of the protection, monitoring and control system for NEX functional units: all the necessary protection, metering, control, monitoring and signalling functions are carried out by Sepam.

Like the NEX range, the Sepam range is a range of units defined to provide an optimal solution for each application, and includes (eg):
- Sepam S, substation incomer and feeder
- Sepam B, bussectioning
- Sepam T, transformer feeder
- Sepam G, generator feeder
- Sepam C, capacitor feeder.

Protection chain

The Sepam protection units combined with innovative current sensors provide a comprehensive measurement, protection and energy management chain.

A high performance, economical solution
The modular Sepam offer provides a cost effective solution tailored to every requirement.

Easy to order and install
All the components in the protection chain are referenced and can be delivered very quickly.

The power of a multi-functional digital unit
Sepam is more than a simple protection relay, it is truly multi-functional unit notably offering:
- circuit-breaker diagnosis functions (switching counter and time, rearming time, cumulated broken A^2)
- direct circuit-breaker control whatever type of release unit
- remote equipment operation using the modbus communication option.

The Sepam will operate with Low Power Current Transducers (LPCT) as defined by standard IEC 60044-8.

Sepam advantages

Reliability
- Over 20 years of experience in multi-function digital protection relays
- Over 150,000 Sepam units in service in more than 90 countries.

Quality
- Quality design based on dependability studies and strict definition of environmental constraints: temperature, pollution, EMC, dielectric strength…
- Quality manufacturing based on procurement agreements with suppliers and inspection throughout all manufacturing phases.

Simplicity of use
- Ergonomic and intuitive user machine interface (UMI).
- User friendly and powerful PC setting software
- Predefined functions implemented by simple parameter setting.

Easy installation
- The same, easy-to-install remote modules for all Sepam units.

Intuitive use
- Clear graphic LCD display of all data required for local operation and installation diagnosis
- Working language may be customized to be understood by all users.

Sepam series 20, series 40, series 80, sepam 100

The Sepam range of protection relays is designed for the operation of machines and electrical distribution networks of industrial installations and utility substations at all levels of voltage.
It includes 3 families:
- Sepam series 20, for usual applications.
- Sepam series 40, for demanding applications.
- Sepam series 80, for custom applications.

To cover all needs, from the simplest to the most complete.
Sepam is compliant with IEC 61850 (series 20, 40, 80).

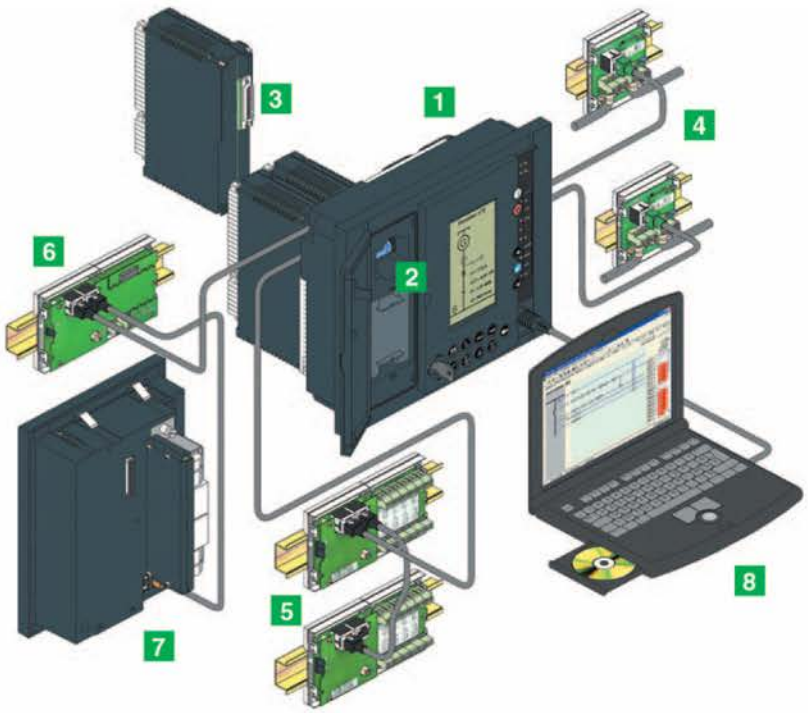
Sepam protection relay

A range of solutions adapted to your application
- Substation protection (incomers, feeders, busbars)
- Transformer protection
- Motor and generator protection.

A comprehensive solution, integrating all of the necessary functions for your application
- Effective protection of people and property
- Accurate measurements and detailed diagnosis
- Integral equipment control
- Local or remote indication and operation.

Flexibility and upgrading capability
To adapt to as many situations as possible, and allow for future installation upgrading, optional modules may be added to Sepam at any time for new functions.

PE57980



Sepam series 80 modular architecture

1- Base unit, with integrated or remote advanced User Machine Interface.

2- Parameter and protection settings saved on removable memory cartridge.

3- 42 logic inputs and 23 outputs relays with 3 optional modules providing 14 inputs and 6 outputs.

4- 2 independent Modbus communication ports.
- *direct connection to 2-wire RS 485, 4-wire RS 485 and fiber optic networks;*
- *connection to Ethernet TCP/IP network via PowerLogic System webserver (Transparent Ready™).*

5- Processing of data from 16 temperature sensors.

6- 1 low level analog output, 0-10 mA, 4-20 mA or 0-20 mA.

7- Synchro-check module

8- Software tools:
- *Sepam parameter and protection setting and control logic customization;*
- *local or remote installation operation;*
- *retrieval and display of disturbance recording data.*

PE60116

Sepam 100 MI

PE57125

Sepam 100 LD

PE57126

Sepam 100 LA

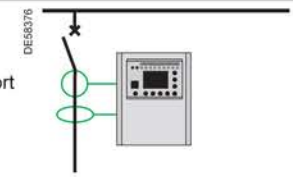
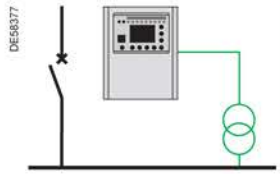
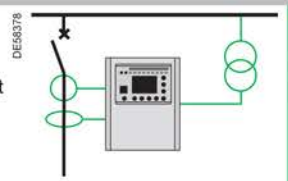
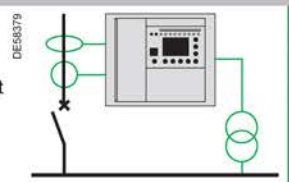
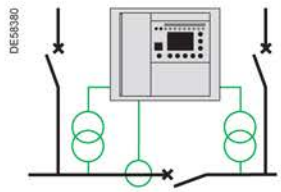
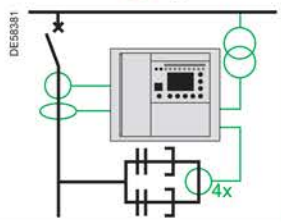
Sepam 100 units

Sepam 100 units round off the Sepam range and can be installed either separately or combined with either Sepam series 20, 40 and series 80.

Sepam 100 has several variants:
Sepam 100 MI, local breaking device control and signalling modules (many different line diagram types are available):
- Sepam 100 LD, high impedance differential protection
- Sepam 100 LA, self-powering protection (back-up protection without auxiliary power supply).

Sepam series 20, series 40, series 80

Selection guide

Sepam		Protections		Applications				
		Basic	Specific	Substation	Transformer	Generator	Busbar	Capacitor
Sepam series 20								
■ 10 logic inputs ■ 8 relay outputs ■ 8 temperature probe inputs ■ 1 Modbus communication port		Current protection		S20 (*)	T20 (*)		S20 (*)	
		Voltage and frequency protection					B21	
			Loss of mains (ROCOF)				B22 (*)	
Sepam series 40								
■ 10 logic inputs ■ 8 relay outputs ■ 16 temperature probe inputs ■ 1 Modbus communication port ■ logic equations editor		Current, voltage and frequency protection		S40 (*)	T40 (*)	G40	S40 (*)	
			Directional earth fault	S41 (*)				
			Directional earth fault and phase overcurrent	S42 (*)	T42 (*)			
Sepam series 80								
■ 42 logic inputs ■ 23 relay outputs ■ 16 temperature probe inputs ■ 2 Modbus communication port ■ logic equations editor		Current, voltage and frequency protection		S80				
			Directional earth fault	S81	T81			
			Directional earth fault and phase overcurrent	S82	T82	G82		
			Transformer or machine transformer-differential		T87	G88		
			Machine differential			G87		
			Voltage and frequency protection for two sets of busbars				B83	
			Capacitor bank unbalance					C86

(*) A Medium Voltage application catalogue is available, for all Medium Voltage equipment designers. Purpose :
- to facilitate the production of Medium Voltage switchgear assemblies which include Schneider Electric compotents
- to specify standard solutions easily

How?
- with specification of the equipment required for each standard application
- and the complete wiring diagram of the Medium Voltage equipment for each application.

Instrument transformers

Current transformers

Conventional current transformers are used to provide power to metering, measuring or control devices. They measure the value of primary current from 10 A to 2000 A. They are in conformity with standard IEC 60044-2.
Schneider Electric has drawn up a list of current transformers which are appropriate for use with digital protection devices in order to make it easier to determine accuracy characteristics.
They are installed in the rear part of the functional unit. The energized part is entirely encapsulated in an epoxy resin, which provides both electrical insulation and excellent mechanical strength.

DE52387

ARJP1

PE56381

ARJP2

For IF-ID (630 A) cubicle

CT types:
IF1 cubicle can use ARJP1/D, ARJP2/D, ARJH and ARJM2

- Single primary current, double secondary current for measurement or protection
- Frequency 50-60 Hz.

PE56382

ARJP3

DE52385

ARJH

DE52386

ARJM2

For IF-ID -BC (1250A) cubicle

CT types:
IF2/ID2/BC2 (*) cubicle can use ARJP3/D, ARJH and ARJM2

- Single primary current, double secondary current for measurement or protection
- Frequency 50-60 Hz.

(*) For ARJP3 only

PE56383

ARJA1

For IF-ID -BC (2000 A) cubicle

IF3/ID3/BC3 cubicle can use ARJA1/D

- Single primary current, double secondary current for measurement or protection
- Frequency 50-60 Hz.

Instrument transformers (cont.)

PE57127

LPCT

LPCT low power current transducer

LPCT's are specific current sensors with a direct voltage output of the "Low Power Current Transducer" type, in conformity with standard IEC 60044-8.
LPCT's provide metering and protection functions.
They are defined by:
- the rated primary current
- the extended primary current
- the accuracy limit primary current or the accuracy limit factor.

These have a linear response over a large current range and do not start to saturate until beyond the currents to be broken.

For IF - BC - RW (630 - 1250 A) cubicle

Transformer TLP160
- Single primary current, double secondary current for measurement or protection
- Frequency 50-60 Hz

I1n (A)	100 to 2500
Ith (kA)	40
t (s)	1
Accuracy class	0.5 - 5P

For IF - BC - RW (2000 A) cubicle

Transformer TLP190
- Single primary current, double secondary current for measurement or protection
- Frequency 50-60 Hz

I1n (A)	100 to 2500
Ith (kA)	40
t (s)	1
Accuracy class	0.5 - 5P

PE57128

Voltage transformer with fuse

Voltage transformers

- Measuring, metering and monitoring devices
- Relays or protective devices
- Auxiliary LV sources for various types of switchgear.

All these devices are protected and insulated from the MV section.
They are in conformity with standard IEC 60044-1.
Schneider Electric has drawn up a list of voltage transformers which are appropriate for use with digital protection devices.
They are installed at the bottom of the functional unit. The energized part is entirely encapsulated in an epoxy resin, which provides both electrical insulation and excellent mechanical strength.

For IF - ID - BM - BC - RF - RW cubicle

Transformer VRS2c/S1 or S2
- Phase/earth
- Frequency 50-60 Hz

Transformation ratio V/V		20000:$\sqrt{3}$ / 100:$\sqrt{3}$	22000:$\sqrt{3}$ / 110:$\sqrt{3}$
Ith (kA)		50	50
t (s)		1	1
Measuring protection	cl 0.5	30-50-100 VA	30-50-100 VA
	3P	50 VA	50 VA

E28678

CSH toroid CT

Zero sequence core balance current transformers (CSH type)

CSH 120 and CSH 200 core balance CT's, provide more sensitive protection by direct measurement of earth fault currents.
Specifically designed for the Sepam range, they can be directly connected to the Sepam "residual current" input.
They are only different in terms of their diameter:
- CSH 120 - 120 mm internal diameter
- CSH 200 - 200 mm internal diameter.

Switchgear

Withdrawable Parts

These include:
- the circuit-breaker or contactor, the disconnector truck or the earthing truck
- the lever-type propulsion mechanism for racking in-out
- interlocks to fix the withdrawable parts onto the fixed part.

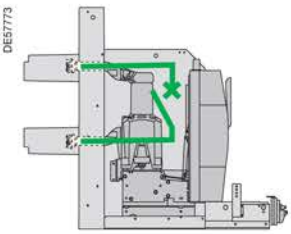
The live parts are housed in an insulating enclosure in the sealed pressure system in compliance with IEC 60056.

The devices used to equip the NEX 24 range of functional units have outstanding features:
- long service life
- maintenance-free live parts
- high electrical endurance
- operating safety
- insensitivity to the environment.

Withdrawable Parts

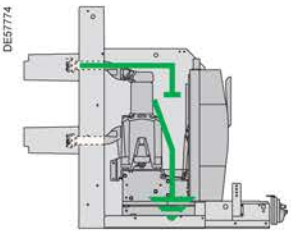
Circuit-breaker
A circuit-breaker is a safety device enabling switching and protection of electrical distribution networks. Installed in the NEX 24 cubicle, it protects all components situated downstream during a short-circuit.

DE57773



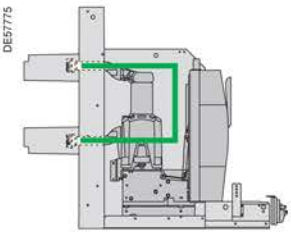
Earthing truck
The earthing truck is a safety feature which allows the cubicle busbar to be earthed. It is installed instead of the circuit-breaker and has the same interlock possibilities.

DE57774



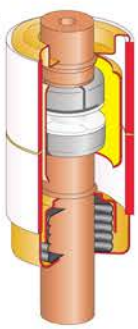
Disconnector truck
The disconnector truck enables the upper and lower part of the cubicle to be short-circuited.
It is installed instead of the circuit-breaker and has the same interlock possibilities.

DE57775



PE56001

DE60162



24 kV internal coil type interrupter

Evolis vacuum circuit-breakers from 1 to 24 kV

Evolis circuit-breaker is used to protect and control MV public or industrial distribution network.
- Rated voltage 24 kV
- Short circuit breaking capacity up to 25 kA
- Rated normal current from 630 A to 2000 A
- Axial magnetic field (AMF) breaking technology
- Withdrawable version.

The Evolis circuit-breaker equips cubicles IF and BC at ratings of up to 24 kV.

High electrical endurance
A magnetic field is applied in the axis of the vacuum interrupter contacts.
This process maintains the arc in diffused mode even at high current values.
It ensures optimal dispersion of the energy over the contact surface and avoids localised temperature rise.
The advantages of this technique are:
- a very compact vacuum interrupter
- low energy dissipation of the arc in the vacuum interrupters.

Evolis is in conformity with the highest electrical endurance class (IEC 62271-100: class E2).

High mechanical endurance
The magnetic field is generated by a patented internal coil which surrounds the contact area. This solution has many advantages:
- a simplified and therefore reliable vacuum interrupter unit
- heavy duty contacts which do not distort under repeated switching operations.

The RI control unit used on Evolis has the advantages of a system which has been proven for 20 years in thousands of installations.
Evolis is in conformity with the most demanding mechanical endurance class (IEC 62271-100: class M2).

Withdrawable Parts (cont.)

Electrical characteristics according to IEC 62271-100

Ur 24 kV	Isc	Ir		
Cubicle width (mm)			800	1000
Ud 50 kV 50 Hz, 1 min Up 125 kV peak	16 kA	630 A	■	
		1250 A	■	
		2000 A		■
	25 kA	630 A	■	
		1250 A	■	
		2000 A		■

Additional characteristics according to IEC 62271-100

Rated values			
Voltage	**Ur**	kV r m s	24
Insulation voltage:			
- power frequency withstand	**Ud**	kV r m s	50
- lightning impulse withstand (1.2/50 µs)	**Up**	kV peak	125
Frequency	**fr**	Hz	50-60
Short time withstand current	**Ik/tk**	kA	Isc/3 s
Peak withstand current	**Ip**	kA peak	2.5 Isc (50 Hz)
			2.6 Isc (60 Hz)
Short circuit making capacity		kA peak	2.5 Isc (50 Hz)
			2.6 Isc (60 Hz)
Other characteristics			
Operating sequence			O-0.3 s-CO-15 s-CO
			O-0.3 s-CO-3 min-CO
			O-3 min-CO-3 min-CO
Operating times	Opening	ms	< 50
	Breaking	ms	< 65
	Closing	ms	< 70
Mechanical endurance	Class		M2
	Number of switching operations		10 000 (30 000 on request)
Electrical endurance	Class		E2
Number of switching operations at full Isc value	16 kA		100
	25 kA		100
	31.5 kA		100
Capacitive current breaking capacity	Class		C1-C2 (for certain applications)
Operating conditions			–25°C to +40°C
Average relative humidity	Over 24 h		< 95%
	Over 1 month		< 90%

Withdrawable Parts (cont.)

PE57164

Operating mechanism description

Evolis range circuit-breakers are actuated by a RI type operating mechanism, that ensures a switching device closing and opening rate that is independent of the operator.
This operating mechanism, which can be motorised, can perform remote control functions and enables fast reclosing cycles.
This operating mechanism includes mechanical devices:

- an energy storage mechanism stores the energy required in the springs,
- to close and then to open the device
- a manual lever-controlled arming device
- a mechanical opening and closing device using two push buttons situated on the front circuit-breaker panel which are accessible with the cubicle door open (circuit-breaker in the test position).

With the door closed and the CB racked in, the circuit-breaker must be electrically operated.

Contact characteristics			
Rated current			10 A
Breaking capacity	AC	220 V (cos φ ≥ 0.3)	1 A
	DC	110/220 V (L/R ≤ 0.02 s)	0.3 A

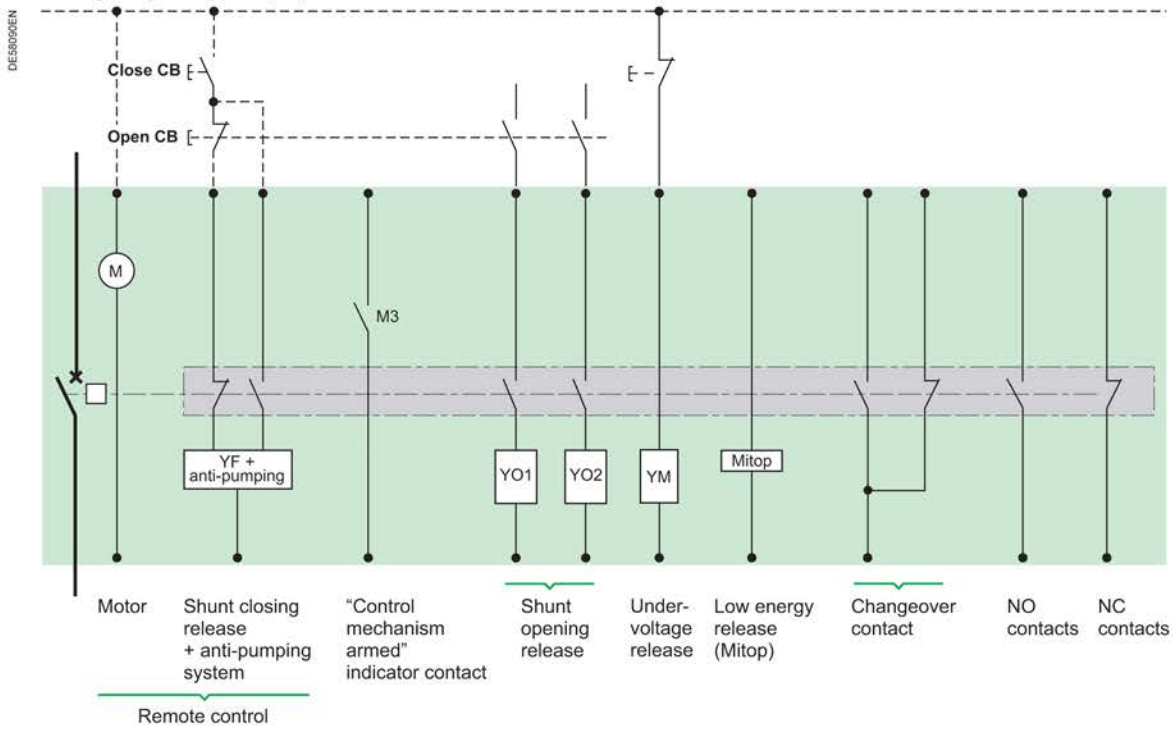
Operating mechanism characteristics

Type of auxiliary			Closing release (YF)	Opening release: Shunt (YO1-YO2) Single	Opening release: Shunt (YO1-YO2) Double	Opening release: Undervoltage (YM)	Spring charging motor (M)	Available contact: NC	NO	Ch
Supply voltage	AC (V)	50 Hz	110 - 220/230				24…32 Vdc 48…60 Vdc/ac 100…127 Vdc/ac 220…250 Vdc/ac			
		60 Hz	120							
	DC (V)		24 - 48 - 110 - 125/127 - 220							
Consumption	AC (VA)		160	160	320	400/100 (1)	380			
	DC (W)		50	50	100	100/10 (1)	380			
Possible combinations of auxiliaries and quantities			■	■		■	■	5	4	1
		or	■	■			■	5	4	1
		or	■		■	consult us	■	5	3	1
		or	■		■		■	5	3	1
		or	■			■	■	5	5	1

(1) Pick-up/latched consumption.

Wiring diagram (principle)

DE58090EN

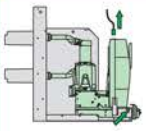
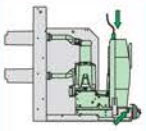
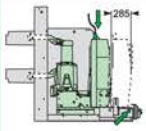


Withdrawable Parts (cont.)
Extraction

This table describes the safety functions available on NEX 24.

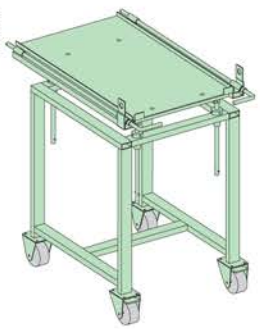
How to use the table
Each of the boxes describes the functional status of each circuit-breaker position and the associated parts:

- Possible status
- Possible status, operation impossible
- Impossible status

Parts		Circuit-breaker positions					
			Insertion ⟶ / ⟵ Extraction			Racking-in ⟶ / ⟵ Racking-out	
		Removed		**Disconnected**	**Test position**		**Service**
1 - Cradle			Fool-proof protection (1)				
			Anti-drop (2)				
		No opening shutters					
		Shutters padlocking possible					
2 - LV plug	Disconnected			No racking-in			
	Connected				No unplugging		
3 - Circuit-breaker	Closed		Auto-discharge function (3)		No racking-in		No racking-out
	Open					No closing	
		Open position circuit-breaker locking available (3)					
4 - Switchboard door	Open				No racking-in		
	Closed				No door opening (4)		
5 - Earthing switch	Open					No earthing switch closing	
	Closed				No racking-in		

(1) *This protection mechanism ensures that the performance levels of the circuit-breaker correspond with those of the cradle.*
(2) *Device that prevents the circuit-breaker from dropping when extracted from the cradle.*
The device can be either unlocked manually or when the extraction rig is put in position.
(3) *Option.*
(4) *Interlocking device to be fitted to the cubicle door. If there is no interlocking, the circuit-breaker device should be inhibited.*

DE58370

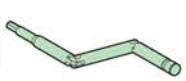


Circuit-breaker extraction table

Enables the circuit-breaker to be taken out of the cubicle and handled during maintenance operations.

- a device using screws and bolts allows the height adjustment up to 250 mm
- a latching device is provided between the extraction table and the cradle.

DE57582



Racking handle

Thls handle enables:

- the withdrawable part to be racked in/out
- the earthing switch to be open/closed.

LB switch cubicle

E74222

Switch

The three rotating contacts are placed in an enclosure filled with gas to a relative pressure of 0.04 MPa (0.4 bars).
The SF6 filled enclosure is of the "sealed pressure system type". Sealing tightness is always checked in the factory.

■ **Safety**

□ the switch may be in one of three positions: "closed", "open" or "earthed", giving a natural interlocking system that prevents operator error.
Moving contact rotation is driven by a fast acting mechanism that is independent of the operator.
□ the device combines the breaking and disconnecting functions.
□ the earthing switch has a short-circuit making capacity in compliance with standards.

041497R

Operating mechanism and auxiliaries

CI2 double function operating mechanism for QM and IM functions

■ **Switch function:**

□ independent closing in two steps:
– operating mechanism recharged by a hand lever or motor
– stored energy released by a push button or trip unit
□ independent opening by push button (O) or trip unit.

■ **Earthing switch function:**

□ independent closing by a hand lever.
Operating energy is provided by the compression of a spring which causes the contacts to close or open after the neutral point is passed.

61032N

CS operating mechanism for TM unit

■ **Switch and earth switch functions**

Dependent-operation opening and closing by lever

■ **Auxiliary contacts**

Disconnector (1 O + 2 C)

■ **Mechanical indications**

Fuses blown.

LB switch cubicle (cont.)

Fuse ratings for NEX 24 protection units depend, among other things, on the following criteria:
- service voltage
- transformer rating
- fuse technology (manufacturer).

Different types of fuses with medium loaded striker maybe installed:
- Solefuse fuses as per standard UTE NCF 64.210
- Fusarc CF fuses as per IEC recommendation 60.282.1 and DIN dimensions 43.625.

For fuse-switch combination unit, refer only to the selection table and reference list of fuses. For all other type of fuses, consult us.

Example: for the protection of a 400 kVA transformer at 22 kV, select either Solefuse fuses rated 16 A or Fusarc CF fuses rated 25 A.

Fuse selection table

Rating in A - no overload at –5°C < t < 40°C.
Please consult us for overloads and operation over 40°C for France Transfo oil immersed type transformers.

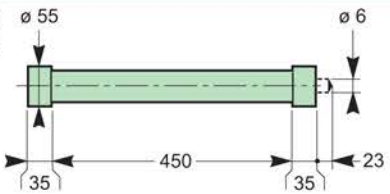
Type of fuse	Service voltage (kV)	Transformer rating (kVA) 25	50	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	Rated voltage (kV)
Solefuse (UTE NFC standards 13.100, 64.210)																			
	20	6.3	6.3	6.3	6.3	16	16	16	16	43	43	43	43	43	63				**24**
Solefuse (general case, UTE NFC standard 13.200)																			
	20	6.3	6.3	6.3	6.3	16	16	16	16	31.5	31.5	31.5	43	43	63				**24**
	22	6.3	6.3	6.3	6.3	16	16	16	16	16	31.5	31.5	31.5	43	63	63			
Fusarc CF and SIBA (1) (general case according to IEC 62271-105)																			
	20	6.3	6.3	10	10	16	16	25	25	31.5	40	40	50	50	63	80	100 (1)	125 (1)	**24**
	22	6.3	6.3	10	10	10	16	20	25	25	31.5	40	40	50	50	80	80	100 (1)	

(1) = SIBA fuses

Fuses dimensions

Solefuse (UTE standards)

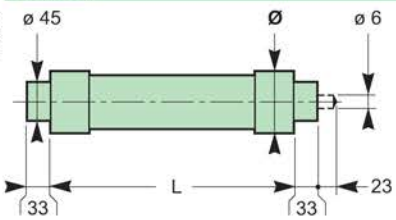
DE57466



Ur (kV)	Ir (A)	L (mm)	Ø (mm)	Weight (kg)
24	6.3 to 63	450	55	2

Fusarc CF

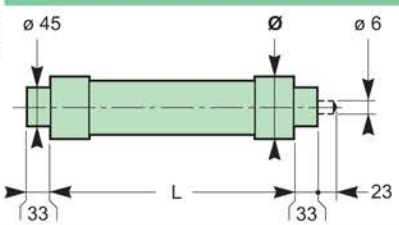
DE57467



Ur (kV)	Ir (A)	L (mm)	Ø (mm)	Weight (kg)
24	6.3	442	50.5	1.6
	10	442	50.5	1.6
	16	442	50.5	1.6
	20	442	50.5	1.6
	25	442	57	2.2
	31.5	442	57	2.2
	40	442	57	2.2
	50	442	78.5	4.1
	63	442	78.5	4.1
	80	442	86	5.3

SIBA

DE57467



Ur (kV)	Ir (A)	L (mm)	Ø (mm)	Weight (kg)
24	100	442	85	5.4
	125	442	85	5.4

Installation

Connections

PE56239

Switchgear resistance to ageing in a substation depends on 3 key factors

■ **The need for correctly made connections**

New cold connecting technologies offer easy installation and favour durability in time. Their design means they can be used in polluted environments with harsh atmospheres.

■ **The impact of relative humidity**

The installing of a heating element is essential in climates with high relative humidities and significant temperature differentials.

■ **Ventilation control**

The dimensions of air vents must be appropriate for the dissipated energy in the substation. They must only sweep across the transformer environment.

Cold connected terminals

Schneider Electric's experience has led it to favour this technology wherever possible for optimum durability.

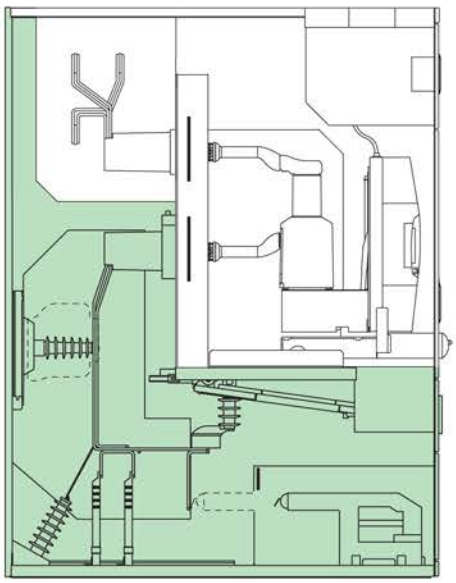
The maximum acceptable cable cross-section for standard assemblies are:

- 500 mm² for incomer or feeder cubicles with single-pole cables;
- 300 mm² for incomer or feeder cubicles with three-pole cables;
- 95 mm² for transformer protection cubicles with fuses.

Access to the compartment is only possible when the earthing switch is closed.

Tightening torques for cables will be attained using a dynamo wrench set to 50 mN.

DE58371



Dry, single core cable

Short end piece, cold connectable

Performance	3 to 24 kV - 400 A - 2000 A
Cross section mm²	50 to 500 mm²
Supplier	all suppliers of cold connectable terminals: Silec, 3M, Pirelli, Raychem...
Number of cables	1 to 2 per phase (630 A) 1 to 3 per phase (1250 A) 1 to 4 per phase (2000 A)
Comments	for greater cross section and number of cables, please consult us

Dry, three core cable

Short end piece, cold connectable

Performance	3 to 24 kV - 400 A - 2000 A
Cross section mm²	50 to 300 mm²
Supplier	all suppliers of cold connectable terminals: Silec, 3M, Pirelli, Raychem...
Number of cables	1 per phase (630 A/1250 A) 1 to 3 per phase (2000 A)
Comments	for greater cross section and number of cables, please consult us

Connections (cont.)

Connection possibilities using dry cables ID - IF - LB

For bottom entry

	IF1	IF2	IF3	ID2	ID3
1 single core per phase	■	■	■	■	■
2 single core per phase	■	■	■	■	■
3 single core per phase	■	■	■	■	■
4 single core per phase			■		■
1 three core per phase	■	■	■	■	■
2 three core per phase	■	■	■	■	■
3 three core per phase	■	■	■	■	■

For top entry

	IF1	IF2	IF3	ID2 *	ID3
1 single core per phase	■	■	*NA*	■	*NA*
2 single core per phase	■	■	*NA*	■	*NA*
3 single core per phase		■	*NA*	■	*NA*
4 single core per phase			*NA*		*NA*
1 three core per phase	■	■	*NA*	■	*NA*
2 three core per phase	■	■	*NA*	■	*NA*
3 three core per phase		■	*NA*	■	*NA*

NA = Not Available
(*) consult us

Bottom cable connection

Cable connection height

Type of cubicle	Configuration		H (mm)
IF1 - IF2 - IF3 - ID	630 to 2000 A	1 set of CTs	450
LB			400

When using cables with termination length greater than 450 mm for NEX 24, install an additional compartment under the cubicle.

Top busbar connection

Additional depth

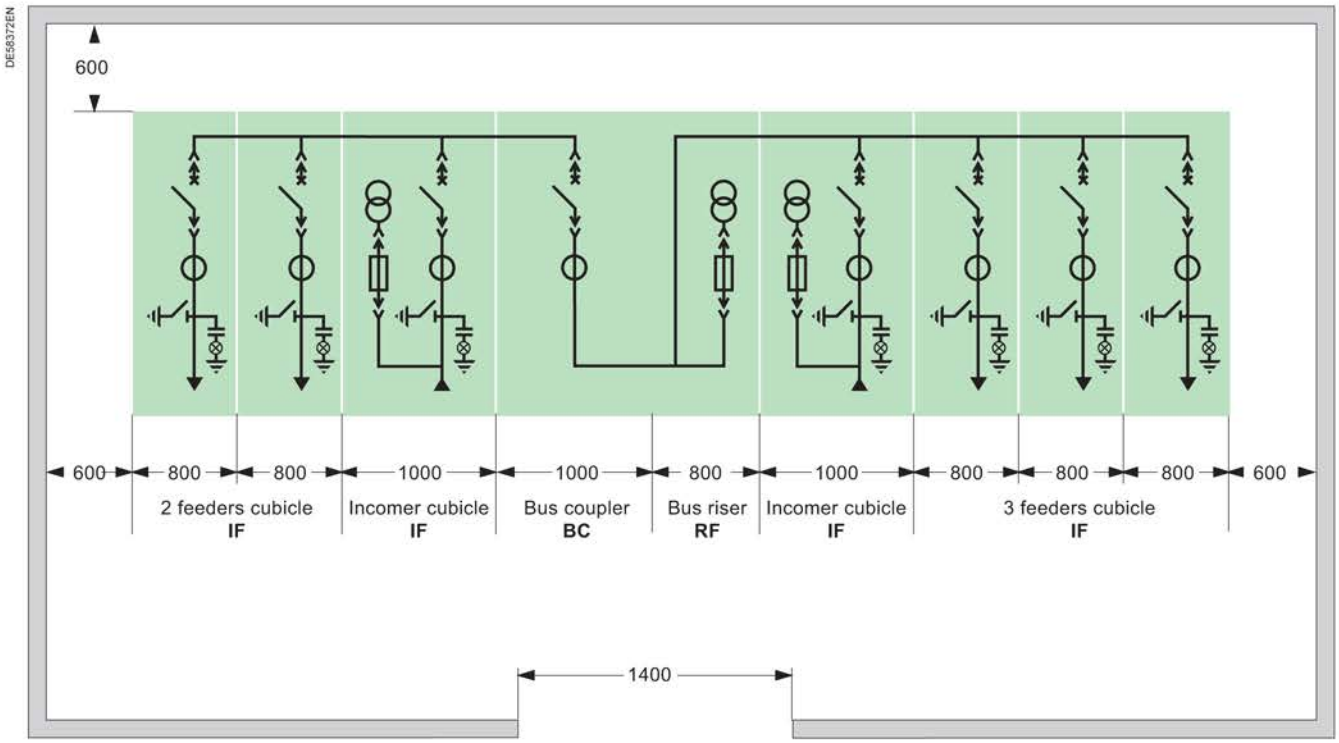
The additional depth is 500 mm as a standard cubicle.
Rated current In: 1250 A and 2000 A.

Type of cubicle	Configuration	
IF2B - IF3B	1250 to 2000 A	1 set of Current Transformers

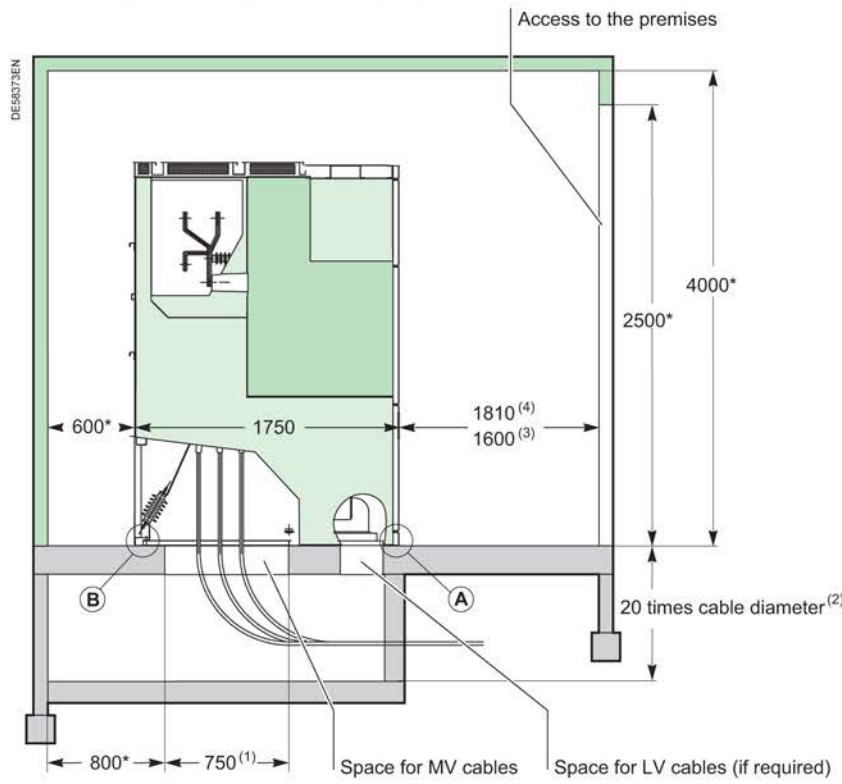
Implementation example

Typical switchboard line up

(2 incoming cubicles and 1 bus-section)



Civil engineering with utility space



(*) Minimum dimensions.
(1) Minimum dimensions to be complied with when installing the NEX 24 switchboard.
(2) Minimum dimensions to be defined according to the cable bending radius.
(3) Operating distances.
(4) Distance needed to extract a functional unit from the switchboard without moving the other units.
A: anchor point
B: adjustment point

Note: for further information, refer to the civil engineering guide, user and instruction manual.

Appendix

Cubicle equipment

Equipment			Type of cubicle IF	ID	BC	RF	RW	BM	LB
Switchgear									
Circuit-breaker			■		■				
Switch									■
Disconnector truck			□		□		■		
Earthing truck			□		□		□		
Fixed connections				■		■			
Racking position indication contact for the withdrawable part		4 NO + 4 NC	□		□		□		
Padlocking of isolating shutters for withdrawable parts			■		■		■		
Disabling of circuit-breaker operating mechanism			□		□				
Voltage Presence Indication (VPIS)			□	□	□			□	■
Locking of mechanical racking of the withdrawable part (padlock)			■		■				
Locking of mechanical racking of the withdrawable part (keylock)			□		□				
Locking of the electromagnetic racking of the withdrawable part			□		□		□		
Earthing switch (SMALT)									
Earthing switch			□	□				□	■
Earthing switch position indication contacts		3 NO + 3 NC	□	□				□	□ (1)
Earthing switch position key locking			□	□				□	□
Electromagnetic earthing switch position locking			□	□				□	
Transformers									
Voltage transformers (1 per phase) phase-earth	Fused fixed		□	□	□	□	□	□	
	Fused withdrawable		□	□	□	□	□	□	
Current transformer	Set of 2 CT's		□	□					
	Set of 3 CT's		□	□	□				
	Set of LPCT's		□		□				
Cubicle									
Protection index enclosure		IP3X	■	■	■	■	■	■	■
		IP4X	□	□	□	□	□	□	□
	Compartments	IP2X	■	■	■	■	■	■	■
Anti-arcing protection	25 kA - 1 s		■	■	■	■	■	■	■
	Internal arc flap signalling contact		□	□	□	□	□	□	□
LV control cabinet key locking			□	□	□	□	□	□	□
LV control cabinet lighting			□	□	□	□	□	□	□
Anti-condensation heating element			□	□	□	□	□	□	□

■ : *basic equipment*
□ : *option*
(1) 1 NO + 1 NC available.