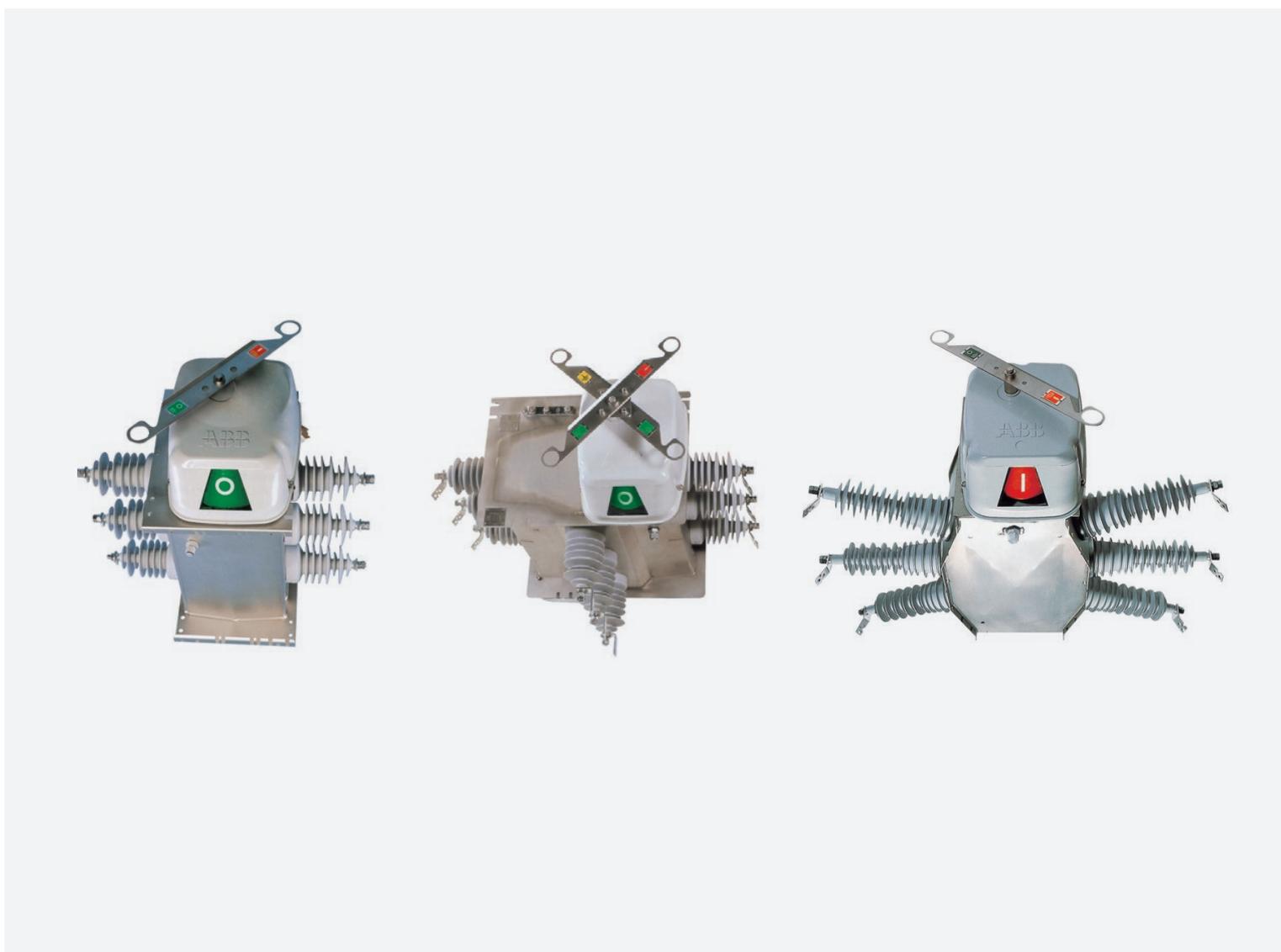


CATALOG

Sectos pole mounted SF₆ load break switch



- Sectos pole mounted SF₆ load break

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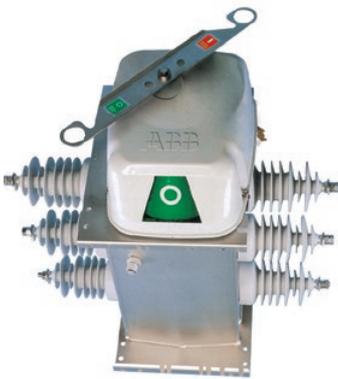
01. General

Product family name "Sectos" is used, when the clause is applicable to all NXA_, NXB_, NXBD_ types. The more specific type markings are given, when the clause is applicable to limited types only.

Sectos is an SF₆-insulated, outdoor pole mounted load break switch family for overhead lines and specifically designed for use in modern remote controlled distribution automation systems. The Sectos offers reliable maintenance free operation even in the most demanding climatic conditions including salt laden atmospheres, corrosive industrial pollution, snow and ice. It has excellent load breaking and fault making capacity and satisfies the isolation requirements specified for load break switch. The earthed metal tank prevents all possible leakage currents across an open

switch. Sectos can be manually operated or motor operated for local and remote electric control, and can be upgraded easily. NXB is designed up to 24kV rated voltages. The unique feature of this type is integrated earthing switch option.

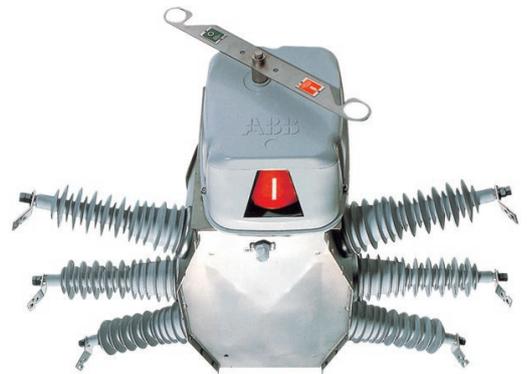
NXBD is a 3-way load break switch using NXB components. Two independent load break switch in one enclosure with the third tapped way can be used for easy and reliable line branching in overhead, cable, or mixed networks. NXA is available for rated voltages 36kV to IEC standards.



01 NXB



02 NXBD



03 NXA

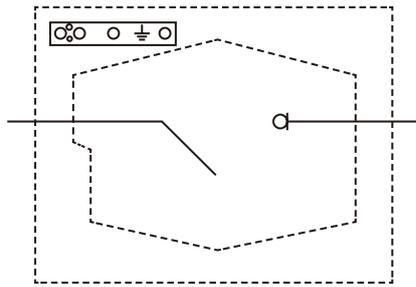
02. Standards for reference

IEC62271-102	High-voltage switchgear and controlgear - Part 102: Alternating current discon-nectors and earthing switches
IEC 62271-103	High-voltage switchgear and controlgear - Part 103: Alternating current switches for rated voltages above 1kV up to and including 52kV
IEC 62271-1	High-voltage switchgear and controlgear - Part 1: Common specifications for alternating current switchgear and controlgear
GB/T 3804	High-voltage alternating curr-ent switches for rated voltage above 3.6kV and less than 40.5kV
GB/T 11022	Common specifications for high-voltage alternating-current switchgear and controlgear standards

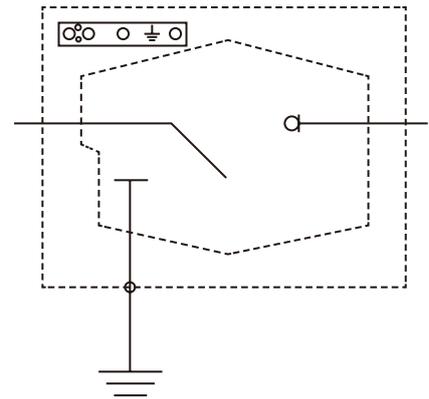
03. Basic switch configurations

Two-position load break switch are available for all NXA_ and NXB_ types.

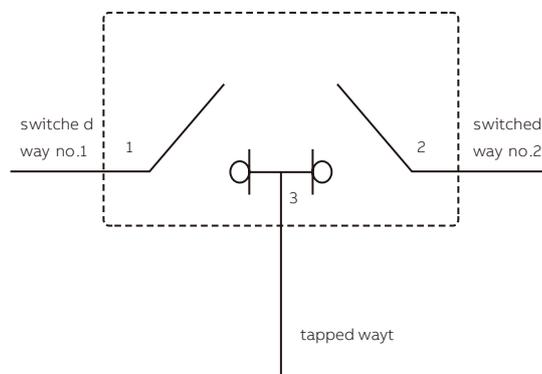
All NXB_ types are also available with an integrated earthing switch for safe and reliable earthing of the downstream line. This version is called a 3-position switch to differentiate from the standard 2-position switch.



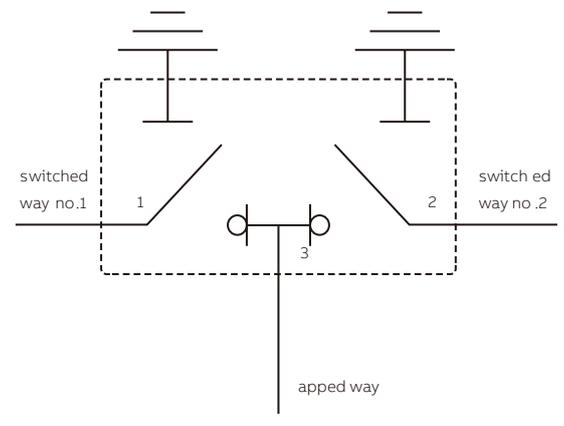
01 Two-position switch



02 Three-position switch



03 Two-position 3-way switch types NXBD_A_



04 Three-position 3-way switch types NXBD_C_

04. Electrical performance data

Insulation level	Unit	NXB and NXBD		NXA
Rated voltage	kV	12	24	36
Power frequency withstand voltage, 50Hz				
- to earth and between phases	kV	42	50	70
- across the isolating distance	kV	48	60	80
Lightning impulse withstand voltage				
- to earth and between phases	kV	75	125	170
- across the isolating distance	kV	85	145	195
Current ratings				
Rated normal current	A	630	630	630
Mainly active load breaking current	A	630	630	630 / 400
Number of breaking operations CO	n	400	400	100 / 400
Line-charging breaking current	A	1.5	1.5	2
Cable-charging breaking current	A	50	50	40
Earth fault breaking current	A	50	50	130
Cable charging breaking current under earth fault conditions	A	28	28	80
No-load transformer breaking current				20
Short-circuit ratings				
Short-time withstand current, I _k	kA/s	20 kA/4s	20 kA/4s	12.5 kA/3s
Peak withstand current	kA	50	50	31.5
Short-circuit making current	kA	50	50	31.5
Number of making operations				
- main switch 50kA (CL E3)	n	5	5	
- main switch 31.5kA (CL E3)	n	10	10	5
- earthing switch 50kA (CL E2)	n	3	3	
- earthing switch 31.5kA (CL E3)	n	5	5	
Creepage distance	mm	620	620	1440
Ambient air temperature limits		-40°C...+60°C*1	-40°C...+60°C*1	-40°C...+ 60°C
Mechanical endurance (number of close-open operations)				
- main switch	n	5000	5000	5000
- earthing switch ²	n	2000	2000	
Filling pressure (+20°C)	bar (abs)	1.4-1.5	1.4-1.5	1.8-1.9
Alarm pressure (+20°C)				
- density switch	bar (abs)	1.2	1.2	1.65
- density gauge	bar (abs)	1.2	1.2	1.6
- low gas lock-out mechanism	bar (abs)	1.1	1.1	1.6
Weight				
NXB (manual operated type)	kg		82	
NXA (manual operated type)	kg		117	
NXBD (manual operated type)	kg		138	
Degree of protection of the mechanism box		IP67	IP67	IP67

1: For CVD -25~°C+60°C.

2: Not suitable for NXA type.

05. Features

The high quality 3mm stainless steel are used for tank, which is designed for its maximum robustness and minimum welding line to minimize corrosion, and specifically to guarantee the safety of the operation personnel even with the internal arc faults at the maximum fault capacity of the tank the Sectos can withstands an internal fault without venting hot gases.

The independent spring operation mechanism adopt ABB patent spiral spring, provides a guaranteed load break fault make capability by ensuring the opening and closing speed of the switch.

Standard SF₆ gas density units with temperature compensated are provided by Sectos (density switch is standard for electrical operated type; density gauge is standard for manual operated type), which ensure no misguide to wrong operating or lock-out by reliable and stable gas pressure measuring.

The Sectos is provided with light reflecting position indicator which are directly connected to the switch operating shaft providing clear and unambiguous switch position indication. Indicator made of light reflecting material, which is easily visible from ground level even at night in driving rain.

Advanced and integrated helium leakage detecting and filling equipment are be adopted, which ensuring SF₆ leakage of each switch is less than 0.05% strictly per year.

The NXB and NXBD type are available as 2-position (ON-OFF) or 3-position (ON-OFF-EARTH) switch. When supplied as a 3-positions switch the unit has facility to earth the line on one side of the switch. The earth position of the 3-positions switch is manually operated only.

Capacitor Voltage Divider can be integrated in the bushings. The typical configuration includes 3 or 6 voltage sensors and provide versatile information of the network condition.

The switch can be manually controlled or it can be provided with an integrated motor drive device for both remote and/or local electrical control. The motor drive device can easily be retrofitted on site to manually operated units.

The control cabinet is fitted with an automatism option (equip with advanced FTU type REC615) which makes the Sectos an automatic sectionalizer function. It can be current-counter scheme with current detection or can be voltage-time scheme with voltage detection.

The solvent painting system is an option for extreme corrosion environment, which is fully compliance with the requirements of standard ISO 12944-9:2018, based on atmospheric corrosivity categories CX in standard ISO 12944-2:2017. Please add special requirement: solvent painting in the checklist when ordering this option.

06. Accessories

Single spring mechanism NXBZ2A

Usually Sectos load break switch is equipped with single spring mechanism. This kind of spring mechanism is suitable for most applications. It's ABB's patent spiral spring, have stable and reliable characteristics. When the operating shaft of the switch is turned by manual or motor drive device, the spring charges during the first part of the movement, releases in the last part of the movement, and turns the switch abruptly to new position. Therefore the switch operates for opening and for closing with the speed, which is completely independent from the operator or from the operating device. Normally, the motor operated switch close or open between 1.5-2.5 seconds from the command signal initiation.

Low pressure lock out device NXBZ4

As an option for sectos, there is available a blocking device, which blocks the operation of the operating mechanism by means of a mechanical latch, releases when the inside gas pressure reduces to lock-out pressure. As the lock-out mechanism operates, an indication sign (gas low) becomes visible through the position indicator window.

The low pressure lock out device is installed in the factory, the lock out device is equipped with an auxiliary contact, which provide electrical lock out for electrical operated type switch.

The low pressure lock out device is recommended to be used where the outside temperature never falls below -10°C and the altitude doesn't exceed 1,000m above sea level.

Standard locking device NXBZ90

As an option for sectos, there is available a locking device, which can lock switch at open or close position by hook stick manual operated under the pole. As locking device operates, an indication sign (locked) becomes visible through the position indicator window.

The manual locking device is installed in the factory, and is equipped with an auxiliary contact, which provides electrical lock out for electrical operated type switch.

Low pressure locking device can be used together with special manual locking device NXBZ90.B.

Density gauge NXAP3

For manual operated Sectos, density gauge can be standard accessory, which indicates gas pressure inside tank.

The density gauge is temperature compensated, variation of the outside air pressure does not affect the indication of the gauge. Therefore is actually indicated the effective pressure of the SF₆ gas inside of the tank.

Density switch ELEGMDI/O

For electrical operated Sectos, density switch is standard accessory, which indicates gas pressure state inside tank. The alarm contact of the density switch is normally closed (NC) and it opens if the gas pressure in the tank falls below 1.2 bar (absolute) at 20°C.



01 Single spring mechanism



02 Low pressure lock out device



03 Manual locking device



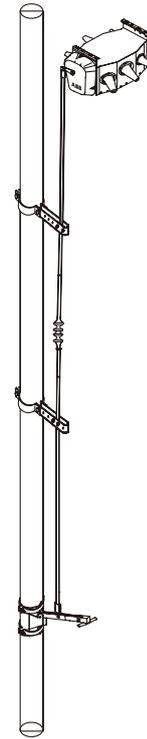
04 Manual locking device



05 Density gauge



06 Density switch



Rod support NPAZL9

Protection insulator of the operating rod NPSZJ30

Rod support NPAZL9

Operating rod NPTOT_

Manual operating device UEKE3

The density switch is temperature compensated, variation of the outside air pressure does not affect the change over switch contact. Therefore is actually showing the density state of the SF₆ gas inside of the tank.

Manual operated type 1

The Sectos are usually operated manually by a insulated hook stick pulled from ground through the hook stick lever in the up mechanism box of switch. This hook stick lever can be pulled in the left to open and the right to close. And it is the only way to be operated for earthing switch when equipped.

Hook stick normally can be provided or be purchased locally according to local requirement.

Manual operated type 2*

As left picture, Sectos can be selected manual operated by device which normally located near to the ground level, and the mechanical movement is transferred to the switch by an operating rod, which moves up and down.

Operating rods NPTOT_

Operating rod sets are available with rods of 2x4m and 3x3m lengths, each set including rod supports and necessary joint pieces.

Rod support NPAZL9

The operating rod is fitted to the pole with rod supports. Normally at least 2 supports are needed. The extension rod set (if necessary) includes 1 rod support.

Protection insulator of the operating rod NPSZJ30

The protection insulator is commonly used with wooden or concrete poles. Its purpose is to increase the safety of the operator.

Manual operating device UEKE3

The manual operating device UEKE3 is suitable for use with sectos load break switch. It can be locked in open and in closed positions with a padlock.

* These accessories are for wood pole mounted, accessories for concrete pole can be offered if required. And this operated type can not be selected when inner earthing switch is needed.

07. Electrical and remote control

7.1 Electrical control

The Sectos can be electrical operated locally, which motor device and electrical control cabinet are needed.

Motor drive device UEMC40K8

Motor drive device is mounted inside mechanism box of side of switch which mounted on the pole. It's can be assembled before leave factory, also can be retrofitted on site to manually operated units when needed by experienced people easily.

24 VDC is normal for this UEMC 40K8 motor drive device, 48 VDC, 60 VDC, 110 VDC, 125 VDC, 220 VDC can be ordered for needs.

Electrical control cabinet UEMC

Electrical control cabinet is mounted under the pole, normally 2-3 meters above ground level on the pole.

Electrical control cabinet UEMC_ is including relevant control circuit and components (heater, protection MCB, push button, operating circuit, and so on), which ensure electrical control locally, and have enough space for relevant FTU (feeder terminal unit) communication device.

For 24 VDC products, relevant charger and batteries are equipped as backup power. Primary power should be double-pole voltage transformer or from close-by substation.

There are 2 standard types of this electrical control cabinet, UEMC-A2 and UEMC-A3.

The cabinet code REC615-A2/A3 will be used if equipped with FTU REC615.

UEMC-A2

Material:

Degree of protection:

Includes:

Space for:

Stainless steel AISI 304
IP55

- Mounting plate
- Self-regulating heater 45W
- 110...250 V AC/DC
- Relay panel
- Wooden pole fixing accessory
- Batteries
- Charger
- 1 or 2 operating circuits
- Remote control equipment

UEMC-A3

Material:

Degree of protection:

Includes:

Space for:

Stainless steel AISI 304
IP55

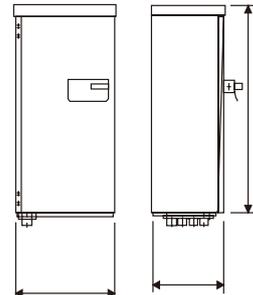
- Mounting plate
- Self-regulating heater 45W
- 110...250 V AC/DC
- Relay panel
- Wooden pole fixing accessory
- Batteries
- Charger
- 1 or 4 operating circuits
- Remote control equipment



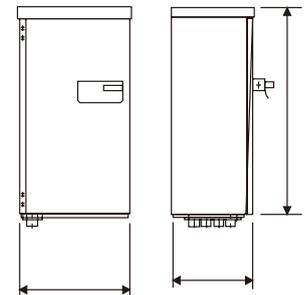
01 Motor drive device UEMC 40K8



02 Electrical control cabinet UEMC-



03 UEMC-A2



04 UEMC-A3

7.2 Remote control and automatic sectionalizer

The control cabinet which is equipped with FTU REC615 can realize remote-control, indication, measurement function, and automatic sectionalizer function.

7.2.1 Functionality of REC615

REC615 is a dedicated grid automation IED (intelligent electronic device) designed for remote control and monitoring, protection, fault indication, power quality analyzing and automation in medium-voltage secondary distribution systems. REC615 is a member of the Relion® product family and a part of its 615 protection and control product series. The 615 series IEDs are characterized by their compactness and withdrawable-unit design. Re-engineered from the ground up, the 615 series has been designed to unleash the full potential of the IEC 61850 standard for communication and interoperability between substation automation devices.

Application

With REC615, the grid reliability can be enhanced, ranging from basic, non-directional overload protection to extended protection functionality with power quality analyses. Thus, REC615 meets today's requirements for smart grids and supports the protection of overhead line and cable feeders in isolated neutral, resistance-earthed, compensated and solidly earthed networks. REC615 is freely programmable with horizontal GOOSE communication, thus enabling sophisticated interlocking functions. The new adaptable standard configuration allows the IED to be taken into use right after the application-specific parameters have been set. As a part of an ABB smart grid solution, REC615 provides superior fault location, isolation and restoration (FLIR) to lower the frequency and shorten the duration of faults (SAIFI/SAIDI).

REC615 offers a variety of features to enhance grid reliability.

- Multiple controllable objects (up to five load-break switches)
- Sophisticated protection functionality to detect, isolate and restore power in all types of network
- Integrated power quality measurement, including voltage dips and swells logging
- Freely programmable
- Load profile and event logging
- Six easily manageable setting groups

- Adaptable standard configuration for rapid commissioning
- Web-based parametrization tool with download possibility
- Same configuration tools as for other ABB relion IEDs such as the 615, 620 and 630 series
- Cyber security features such as audit trail
- Withdrawable-unit design
- Large, easy-to-read LCD screen with SLD, local control and parametrization possibilities with dedicated push buttons for safe operation
- Extendable I/O with RIO 600
- Environmentally friendly design with ROHS compliance

Human machine interface

As a member of the relion family, REC615 shares the same human machine interface (HMI) look and feel as the other Relion IEDs. The location of a push button with a certain function is always the same and the menu structure identical. Consequently, once you become familiar with one Relion IED, you can use them all.

Up to five load-break switches can be controlled via the IED's front panel HMI or a remote control system. To protect the IED from unauthorized access and to maintain the integrity of information, the IED is provided with a four-level, rolebased user authentication system, with individual passwords for the viewer, operator, engineer and administrator levels. The access control system applies to the front panel HMI, embedded web browser-based HMI and protection and control IED manager PCM 600.



Standardized communication

REC615 supports a variety of communication protocols for remote communication, such as IEC 60870-5-101/104, DNP3 level 2 and modbus, simultaneously also supporting IEC 61850 with GOOSE messaging.

Communication Protocols:

- IEC 60870-5-101/104
- DNP3 level 2
- Modbus
- IEC 61850 with GOOSE messaging communication

7.2.2 Automatic sectionalizer

Sectos load break switch can as automatic sectionalizer with control cabinet easily. Which also includes all remote-function at the same time, don't need add any hardware components.

As the 80-90% of medium voltage overhead line faults are self clearing or transient by nature and last for a few cycles or seconds. In coordination with the main circuit-breaker or reclosers, The Sectos load break switch is able to distinguish between transitory and permanent faults occurring in the section it is installed in. Only in case of a permanent fault, it will isolate the line automatically.

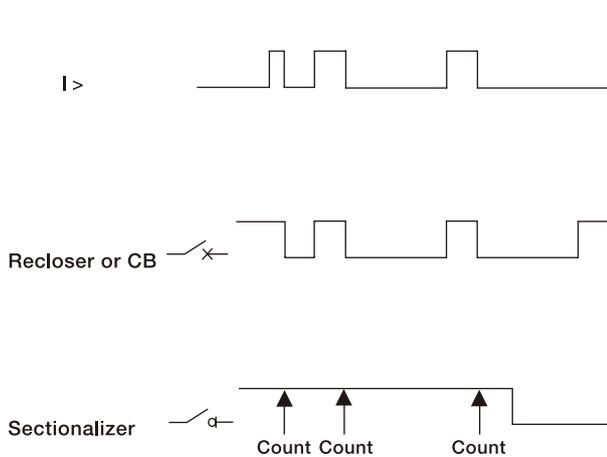
From principle and application, the Sectos can as two kinds of sectionalizer, one is current based sectionalizer (need current detection), the other is voltage based sectionalizer (need voltage detection).

Current based automatic sectionalizer

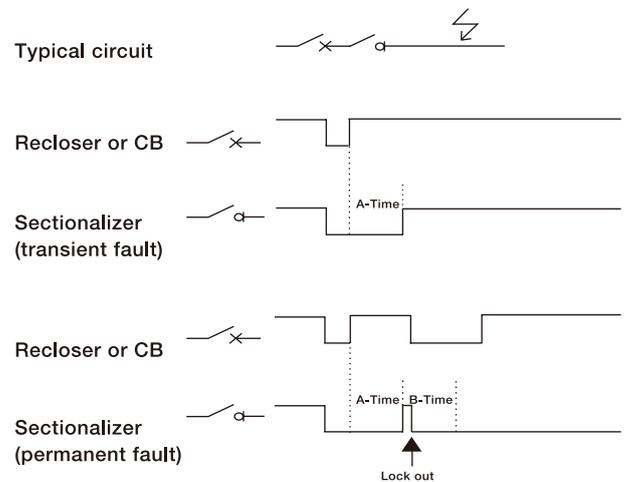
- Automatic sectionalizers are selfcontained, automatically controlled circuit-opening devices
- Automatic sectionalizers counts the fault current operations of a upstream reclosing device
- Automatic sectionalizers operates after a preselected number of fault current operations
- Automatic sectionalizers isolate the faulted section of a distribution feeder after the feeder has been deenergized by e.g. a recloser or reclosing CB

Voltage based automatic sectionalizer

- Automatic sectionalizers are selfcontained, automatically controlled circuit-opening devices
- Lose voltage to open
If switch detect lost voltage two side of switch, switch open immediately
- Add voltage to close (A-Time)
Either side add voltage and last A-Time switch close
- A-Time open lockout
Either side add voltage and lost it within A-Time, switch hold open and lockout
- B-Time
Switch close and start B-Time, If no lost voltage till B-Time time out, switch hold close
- B-Time open lockout
Switch close and start B-Time, If lost voltage within B-Time, switch open and lockout (load side fault)
- Apply to loop and emanative circuits



01 Current based automatic sectionalizer



02 Voltage based automatic sectionalizer

08. Main construction and mounting

8.1 Main construction

Below picture take example for NXB load break switch.

Manual operated type including item1 and 2.

Local electrical operated type including item1, 2, 3 and 6.

Remote control or automatic sectionalizer (current based scheme) type including all items listed.

Voltage based scheme need voltage detection only, CT relevant item 4 and 5 are not necessary.

8.2 Mounting modes

Sectos load break switch can be mounted below or above crossarm which mounted on single or double poles easily.

8.2.1 Below the crossarm

Sectos can be mounted below the crossarm easily.

Crossarm NPTRN1T6/J401464

The standard crossarm is 80x80 square tube. There are two standardized lengths, 2,000mm (NPTRN1T6) and 2,850mm (J401464). See dimension drawings at the point 9.4.

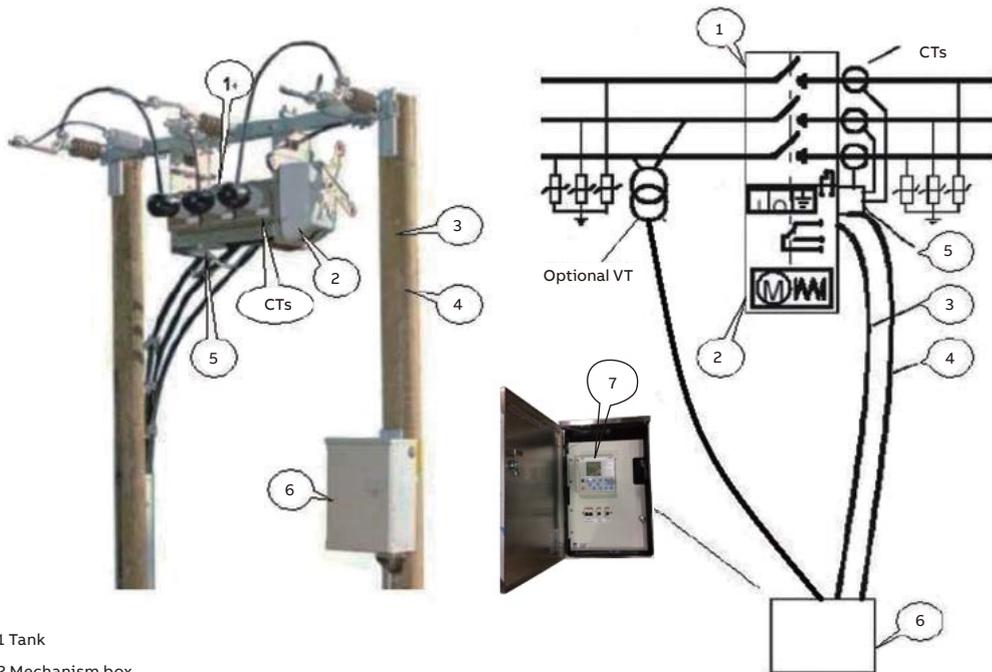
Fixing clamp NXAM 1 or 2

Sectos is easy to install below the crossarm using these 2 pieces fixing clamps.

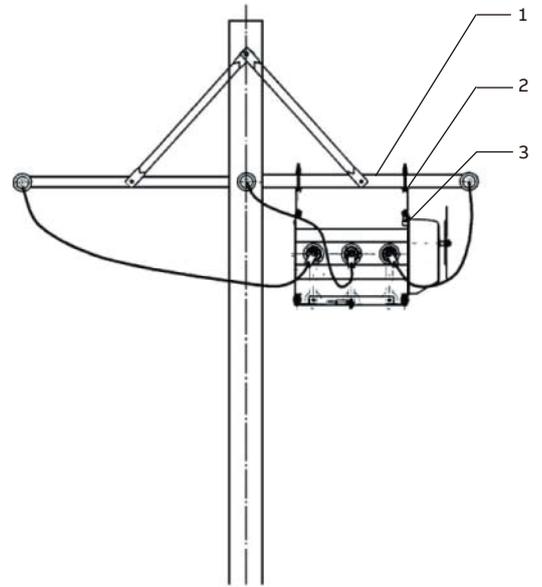
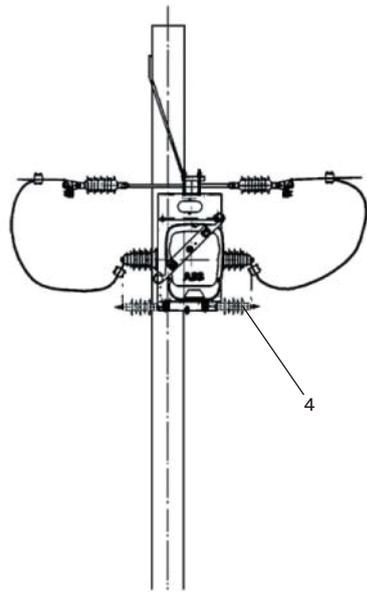
See dimension drawings at the point 9.5.

NXAM1 is use for 80...100x80...100 crossarm. 2 pieces NXAM1 are included in the delivery as a standard accessory for every type Sectos switch.

NXAM2 is use for 100...160x100...160 crossarm.

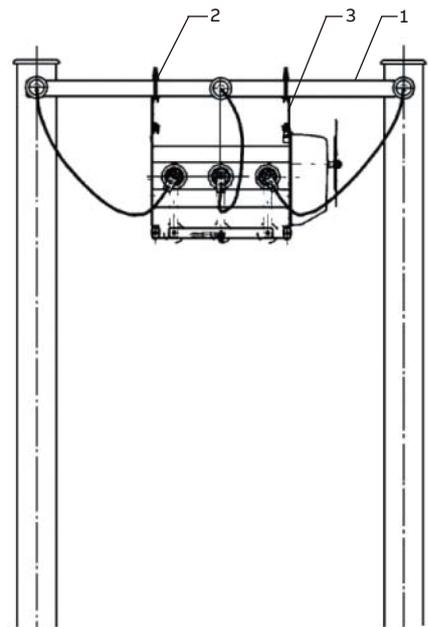
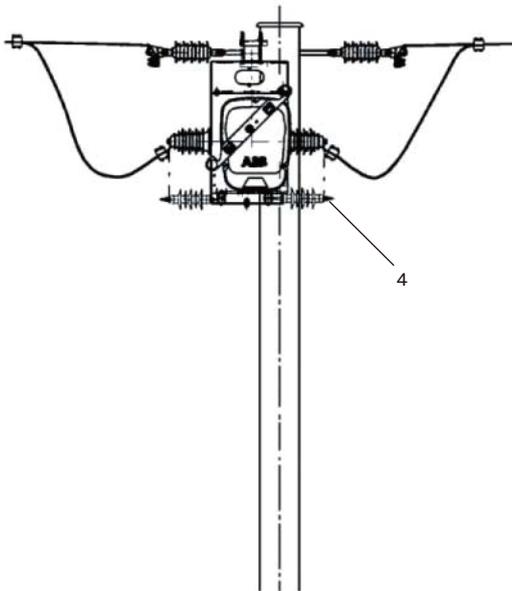


- 1 Tank
- 2 Mechanism box
- 3 Control cable
- 4 CT measure cable1
- 5 CT junction box
- 6 Electric control cabinet
- 7 Control unit



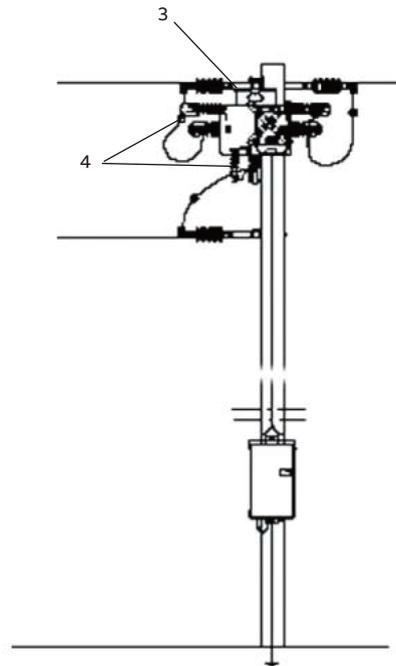
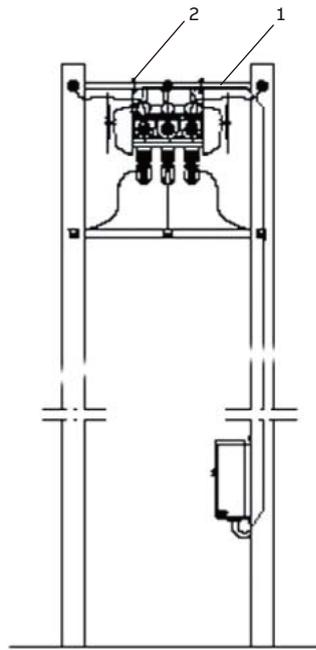
01 Single pole (suitable for NXA and NXB)

- 1 Crossarm
- 2 Fixing clamp
- 3 Spacer plate
- 4 Surge arrester



02 2 Double poles (suitable for NXA and NXB)

- 1 Crossarm
- 2 Fixing clamp
- 3 Spacer plate
- 4 Surge arrester



—
NXBD mounted at double poles normally

- 1 Crossarm
- 2 Fixing clamp
- 3 Spacer plate
- 4 Surge arrester

Spacer plate NXBZ59

The spacer plates are required, if a 3-position switch (with inner earthing switch).

The spacer plates can be without, if a 2-position switch (without inner earthing switch).

The spacer plate is standard for NXBD type. see dimension drawings at the point 9.6.

Surge arresters MWK

To protect the Sectos against atmospheric overvoltages, it is often necessary to install surge arresters on one or both sides of the switch. normally. It can be purchased locally according to features of local power network.

8.2.2 Above the crossarm

Sectos (except NXBD) can be mounted above the crossarm easily.

Description of crossarm and surge arrester can be found in point 8.2.1.

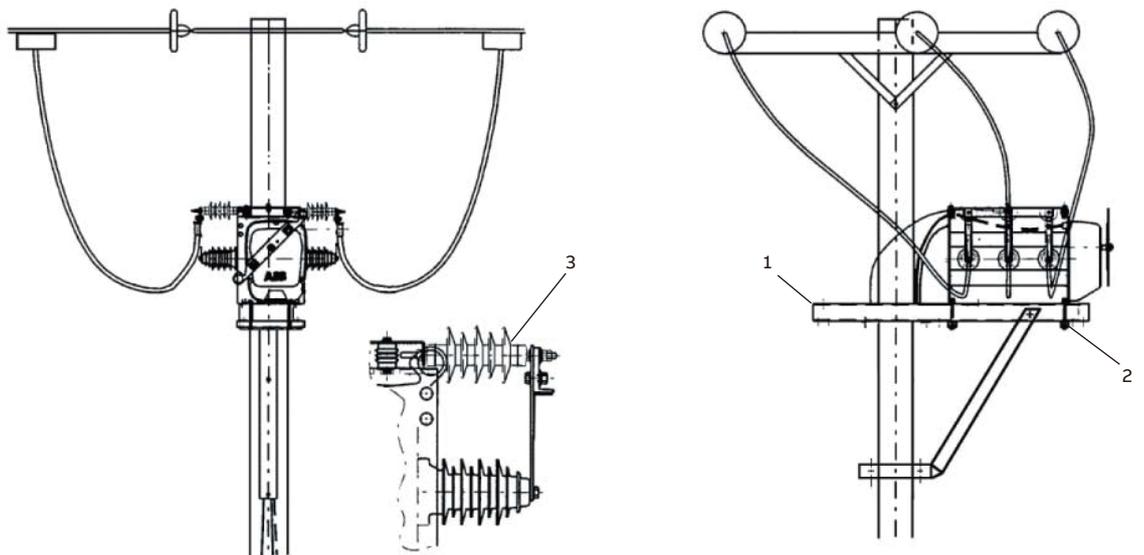
Fixing clamp

NXB is easy to install above the crossarm using 2 pieces fixing clamps---NXAM 1 or NXAM 2.

NXA is easy to install above the crossarm using 2 pieces fixing clamps---NXAM 4 or NXAM 5.

See dimension drawings at the point 9.7.

NXAM4 is use for 80...100x80...100 crossarm.
NXAM5 is use for 100...160x100...160 crossarm.

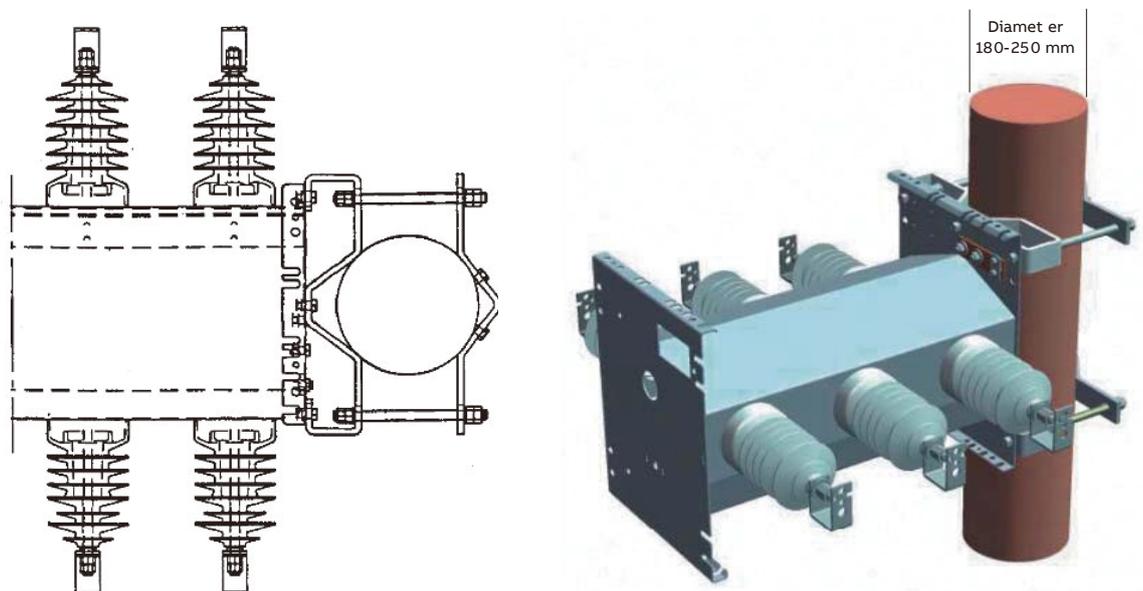


NXBD mounted at double poles normally

- 1 Crossarm
- 2 Fixing clamp
- 3 Surge arrester

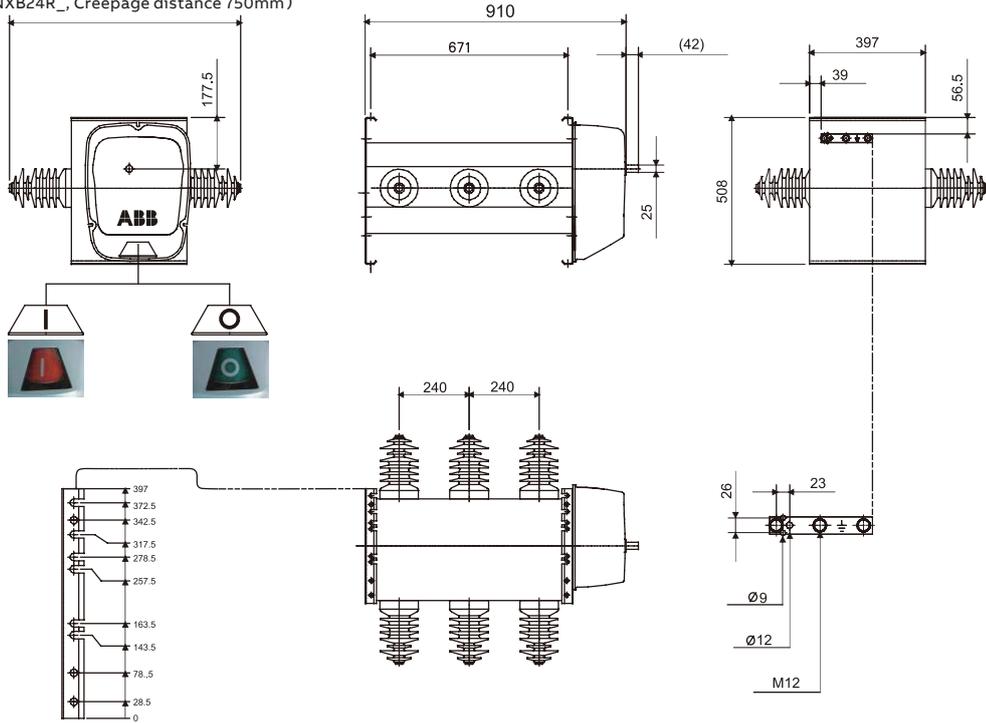
8.2.3 Mounted on pole directly

Sectos (only NXB) can be mounted on pole (diameter 180mm to 250mm) directly (as right picture) when this mounting type is selected, a set of fixing accessory (named NXBZ204) should be selected.

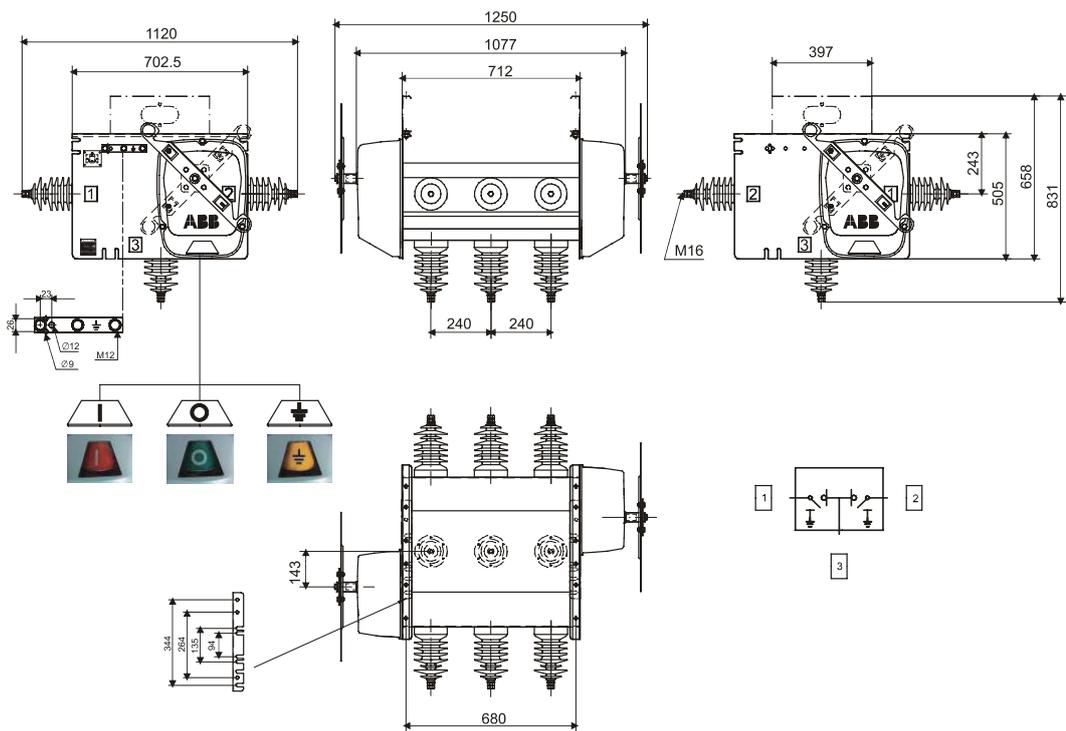


09. Dimension drawings (unit: mm)

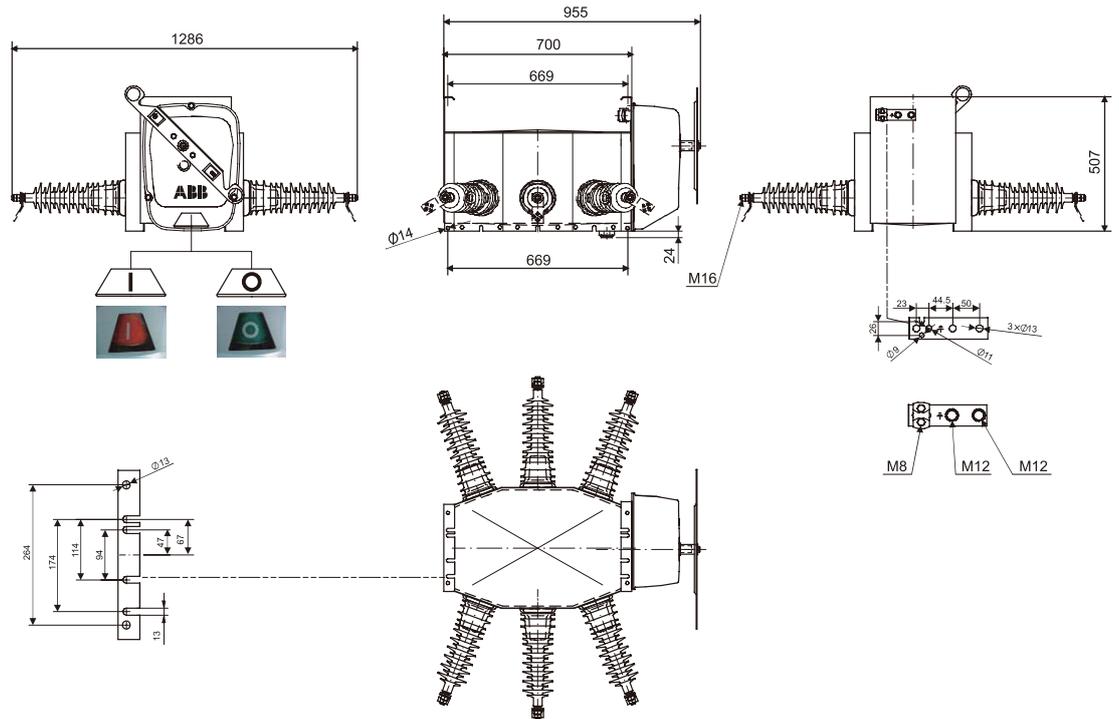
796 (NXB24C_, Creepage distance 620mm)
 1128 (NXB24D_, Creepage distance 960mm)
 862 (NXB24R_, Creepage distance 620mm)
 932 (NXB24R_, Creepage distance 750mm)



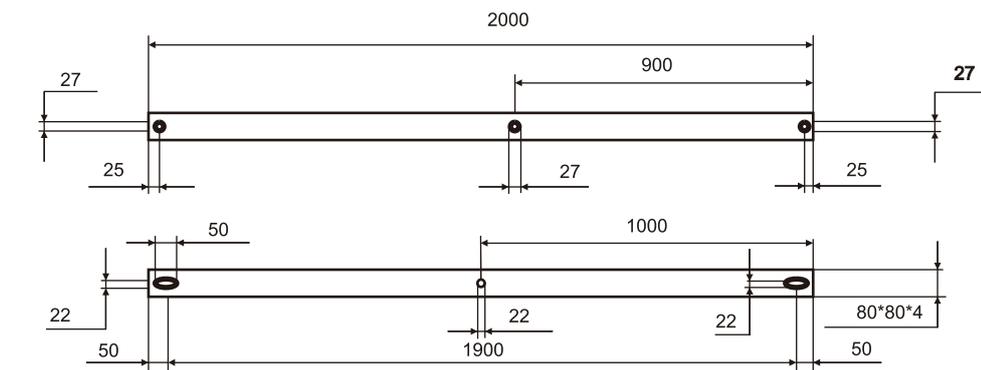
9.1 NXB load break switch



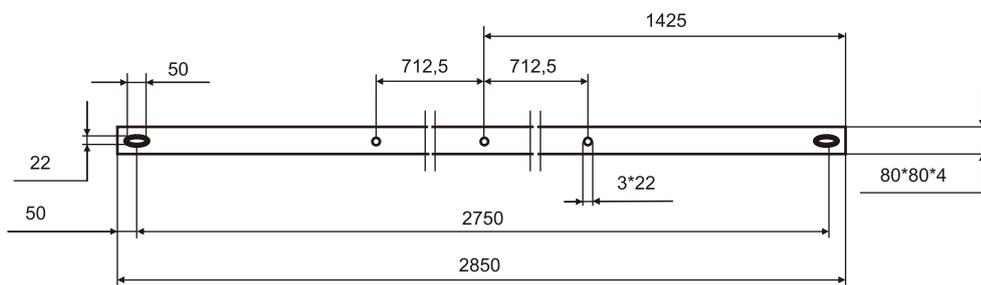
9.2 NXBD load break switch



9.3 NXA load break switch

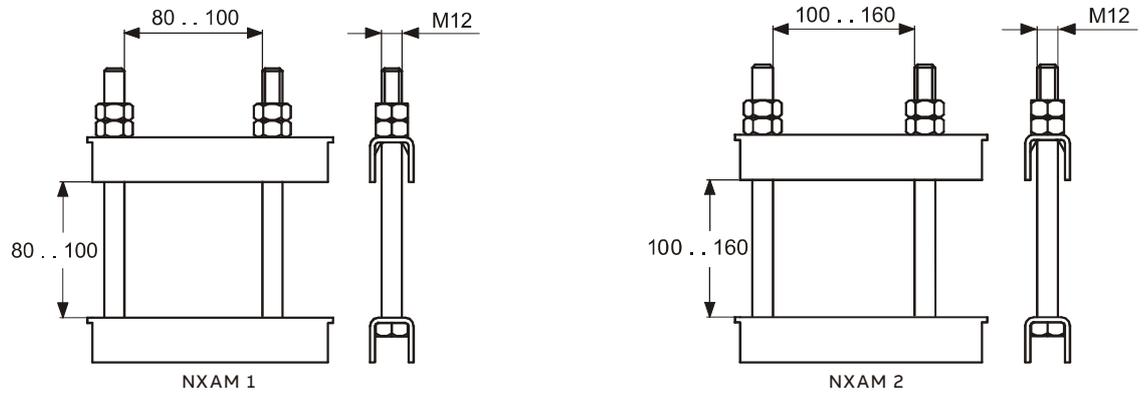


Type NPTRN1T6 only for NXB

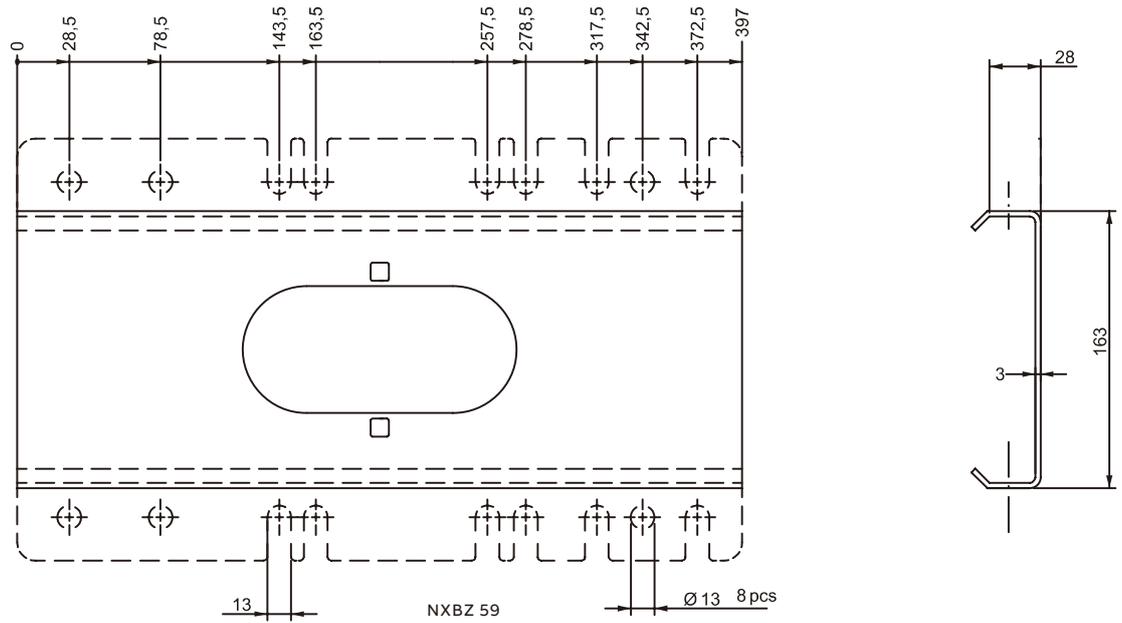


Type J401464 for NXA and NXB

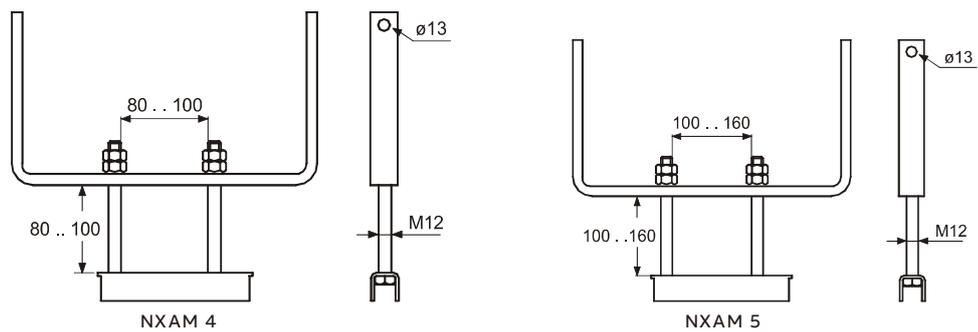
9.4 Crossarm NPTRN1T6/J40164



9.5 Fixing clamp NXAM 1/NXAM 2



9.6 Spacer plate NXBZ59



9.7 Fixing clamp NXAM 4/NXAM 5

10.3 CT, VT

CT and VT are option items when order Sectos.

Ring type current transformer KOKU072G4 are standard type of Sectos, for some special application, applies to the fault indicator SPEF 3A2C, current transformer type KOKU072G3 (same size with KOKU072G4) can be used. The ratio of it is 400/0.1A, the CT of each phase are connected to the shielded download cable KOHZ11 in the branching box SPEC 6, which also includes an over voltage protection.

Installed around the bushings of Sectos

- Type: KOKU 072 G4
- Ratio: 400/1A, 600/1A
- Burden/Class: 3 VA/5 P10 0.5 VA/5 P20



VT (voltage transformer) should be equipped as power or voltage measuring.

TDO 6 type can be provided, also local purchasing according local requirement is available.

Outdoor voltage transformers TDO 6

- Highest voltage for equipment [kV] 12, 17, 5, 24, 25
- Power frequency test voltage, 1min [kV] 28, 38, 50
- Lightning impulse test voltage [kV] 75, 95, 125
- Max. rated burden, classes [VA/cl]
50/0.2-100/0.5-burden





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