

# PHOTOVOLTAICS

COMPONENTS FOR  
PHOTOVOLTAIC APPLICATIONS



[www.noark-electric.eu](http://www.noark-electric.eu)

# NOARK

NRKEM  
100A MO 2T

0,25-3(100)A kWh-Ø  
MID T 11260 kvarh-Ø  
Tariff  
CE M18

In: 25kA  
I<sub>max</sub>: 50kA  
U<sub>c</sub>: 275V(500kVh)  
U<sub>p</sub>: 1.9kV  
160A  
IEC 61643-11  
EN 61643-11

In: 25kA  
I<sub>max</sub>: 50kA  
U<sub>c</sub>: 275V(500kVh)  
U<sub>p</sub>: 1.9kV  
160A  
IEC 61643-11  
EN 61643-11

PE



NOARK  
EVRP  
1000V  
10x38

NOARK  
EVRP  
1000V  
10x38

NOARK  
EVRP 20  
I<sub>max</sub>: 40kA  
In: 20kA PV  
U<sub>p(H-PE)</sub>: 2.9kV  
U<sub>p(L-N)</sub>: 5.0kV  
U<sub>ov(H-PE)</sub>: 750V  
U<sub>ov(L-N)</sub>: 1500V  
EN 50539-11

NOARK  
EVRP 20  
I<sub>max</sub>: 40kA  
In: 20kA PV  
U<sub>p(H-PE)</sub>: 2.9kV  
U<sub>p(L-N)</sub>: 5.0kV  
U<sub>ov(H-PE)</sub>: 750V  
U<sub>ov(L-N)</sub>: 1500V  
EN 50539-11

NOARK  
EVRP 20  
I<sub>max</sub>: 40kA  
In: 20kA PV  
U<sub>p(H-PE)</sub>: 2.9kV  
U<sub>p(L-N)</sub>: 5.0kV  
U<sub>ov(H-PE)</sub>: 750V  
U<sub>ov(L-N)</sub>: 1500V  
EN 50539-11

NOARK  
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I<sub>max</sub>: 40kA  
In: 20kA PV  
U<sub>p(H-PE)</sub>: 2.9kV  
U<sub>p(L-N)</sub>: 5.0kV  
U<sub>ov(H-PE)</sub>: 750V  
U<sub>ov(L-N)</sub>: 1500V  
EN 50539-11



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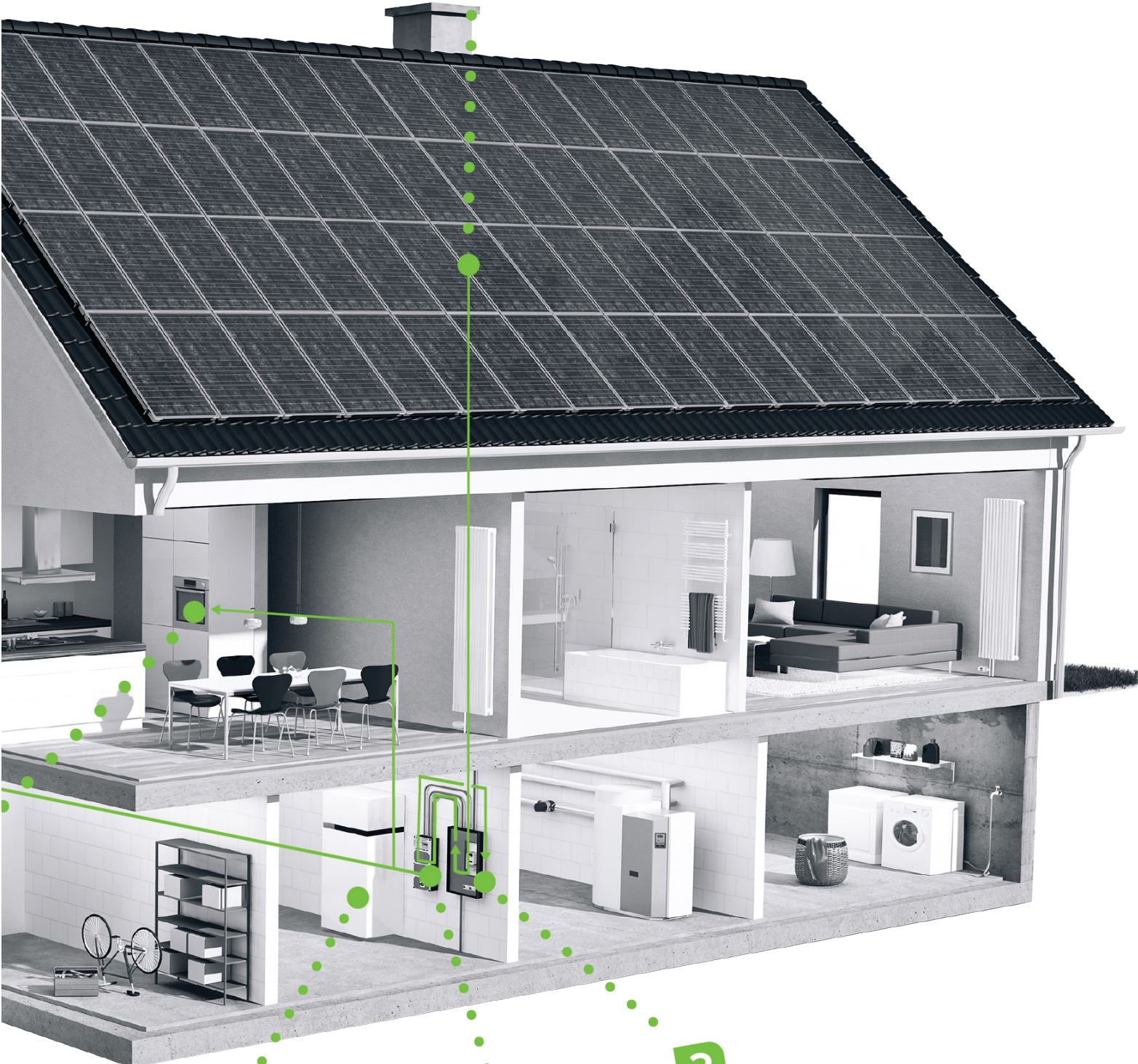
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# APPLICATION SCHEME



1

SOLAR  
PANEL



4

BATTERY  
STORAGE

3

POWER  
INVERTER

2

AC & DC  
PROTECTION

# DC Fuse Disconnectors Ex9FP

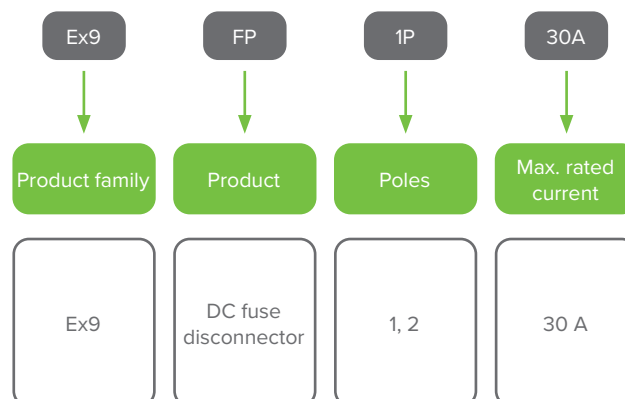


- DC fuse disconnectors
- Suitable for PV systems
- Rated short-circuit breaking capacity  $I_{cn}$  with appropriate fuse-link up to 33 kA
- Rated current up to 30 A
- Rated operational voltage 1000 V DC
- Optical tripping indicator
- Fuse-links of size 10 x 38 mm
- 1 and 2-pole variants
- Utilization category DC-20B

Fuse disconnectors Ex9FP for photovoltaic string protection against short circuit and overload. Suitable for cylindrical fuse-links of size 10 x 38 mm.

LED optical tripping indicator on the front side is signaling the fuse fault.

## Type Key



## Certification marks



# DC Fuse Disconnectors

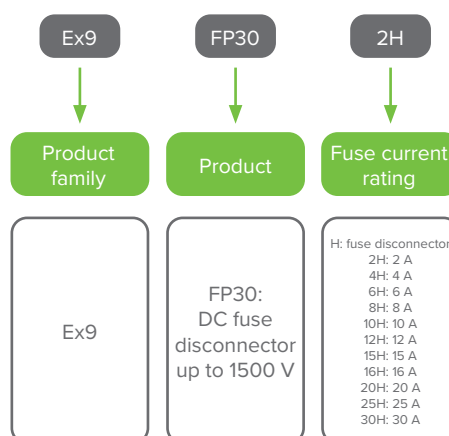
## Ex9FP30H



- DC Fuse disconnectors for PV systems
- Rated short-circuit breaking capacity  $I_{cn}$  with appropriate fuse-link up to 20 kA
- Rated current up to 30 A
- Rated operational voltage 1500 V DC
- Fuse-links of size 10 x 85 mm

Fuse disconnectors Ex9FP30H for photovoltaic string protection against short circuit and overload. Suitable for cylindrical fuse-links of size 10 x 85 mm.

### Type Key



### Certification marks



# DC Surge Protection Devices Ex9UEP (N)



- DC Surge Protection Devices suitable for Photovoltaic systems
- PV T2 (Class II, Type 2, C) class SPDs
- Meet requirements of IEC / EN 61643
- Nominal discharge current  $I_n$  20 kA (8/20  $\mu$ s) per path
- Maximum discharge current  $I_{max}$  40 kA (8/20  $\mu$ s)
- Max. continuous operational voltage UCPV from 500 to 1500 V DC
- For grounded and ungrounded PV systems
- Plug-in module design with status indication
- Optional remote indication contact

DC Surge protection devices Ex9UEP are suitable for photovoltaic applications. These SPDs are designed and tested according PV T2 class from IEC / EN 61643 standard.

Indication front window helps users to know the status of device and remote-signal port is able to provide remote indication and alarm.

Plug-in module design make it convenient to change module without device disconnection.

## Type Key

Ex9	UEP		20	R	3P	1200		(N)
Product family	Product	Class	Current	Signaling contact	Module width	Max. oper. voltage	Plug-in module	Version
Ex9	UEP: DC Surge Protective Devices	_ : PV T2 class II C T2	$I_n$ (8/20 $\mu$ s) 20 kA	R: Yes _ : No	1P: 1 MU 2P: 2 MU 3P: 3 MU	500 V DC 600 V DC 750 V DC 1000 V DC 1200 V DC 1500 V DC	_ : Complete device M: Plug-in module only	(N): Meets requirements of EN 61643

## Certification marks



# DC Surge Protection Devices Ex9UEP1+2



- DC Surge Protection Devices suitable for Photovoltaic systems
- PV T1+T2 (Class I+II, Type 1+2, B+C) class SPDs
- Nominal discharge current  $I_n$  20 kA (8/20  $\mu$ s) per path
- Maximum discharge current  $I_{max}$  40 kA (8/20  $\mu$ s)
- Impulse discharge current  $I_{imp}$  6.25 kA (10/350  $\mu$ s)
- Max. continuous operational voltage  $U_{CPV}$  from 500 to 1500 V DC
- For grounded and ungrounded PV systems

DC Surge Protection Devices Ex9UEP1+2 are suitable for photovoltaic applications. These SPDs are designed and tested according PV I+II class from IEC / EN 61643-31 standard.

Indication front window helps users to know the status of device and remote-signal port is able to provide remote indication and alarm.

Plug-in module design make it convenient to change module without device disconnection.

## Type Key

Ex9	UEP	1+2	6.25	R	3P	1500	
Product family	Product	Class	Current	Signaling contact	Module width	Max. oper. voltage	Plug-in module
Ex9	UEP: DC Surge Protective Devices	PV T1+T2 class I+II B+C T1+T2	$I_{imp}$ (10/350 $\mu$ s) 6.25 kA	R: Yes _: No	1P: 1 MU 2P: 2 MU 3P: 3 MU	500 V DC 600 V DC 750 V DC 1000 V DC 1200 V DC 1500 V DC	_: Complete device M: Plug-in module only

## Certification marks



# DC Miniature Circuit Breakers Ex9BP up to 1000 V DC

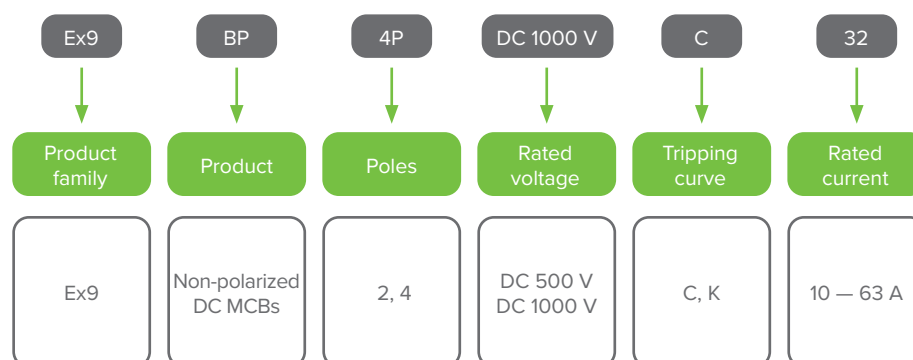


- DC Miniature Circuit Breakers
- Non-polarized, suitable for photovoltaic applications
- Tested according to IEC / EN 60947-2
- Rated short circuit breaking capacity  $I_{cu}$  6 kA
- Rated operating voltage  $U_e$  of 250 V DC per pole
- Width 2 and 4 modules
- Tripping characteristics C, K
- Rated current up to 63 A
- Wide range of accessories

DC miniature circuit breakers Ex9BP are designed for direct current applications. Thanks to their polarity independency are suitable for photovoltaic applications.

It can be combined with wide range of accessories including auxiliary and signal contacts, shunt trip release and undervoltage release. It is possible to create diversified combination of accessories. These combinations are only limited by total number, not by the type of accessories - all components fit together. It can be used up to three units of auxiliary or alarm contacts plus up to two units for release units.

## Type Key



## Certification marks



# Isolators Ex9I40



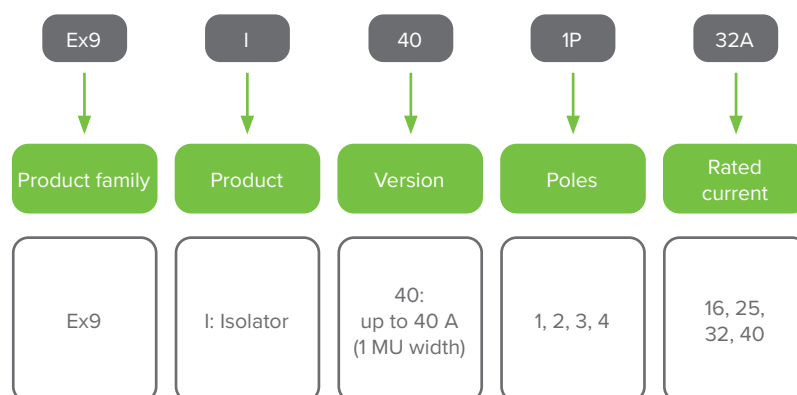
- Modular Isolators
- Rated current up to 40 A
- Width 1 MU up to 4-pole version
- Rated voltage 230 / 400 V AC
- Rated short-time withstand current  $I_{cw} = 12 \times I_e, 1 \text{ s}$
- Meet requirements of IEC / EN 60947-3
- Built-in lock mechanism for OFF position
- 1 up to 4-pole version

Isolators Ex9I40 can be used as a main switch in wide variety of applications. These switches are tested according to IEC / EN 60947-3 standards and also fulfill the requirements for the isolation functionality.

Utilization category AC-22A ensures possibility of switching mixed resistive and inductive loads with low overloads with  $\cos \varphi = 0.65$ . Subcategory A allows frequent operation.

Isolators of line Ex9I40 are produced in modular design with width one module unit for all versions up to 4-pole. It brings very low consumption of space in an installation.

## Type Key



## Certification marks



# DC Isolators Ex9IP

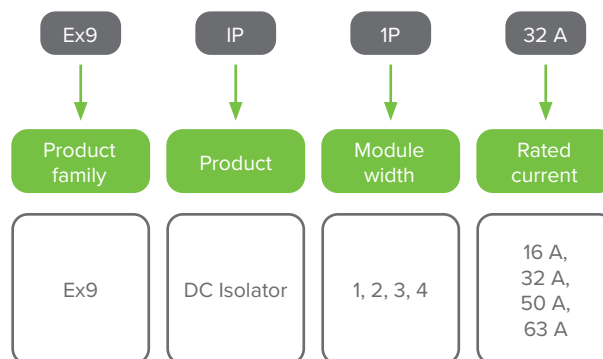


- DC modular isolators
- Non-polarized, suitable for PV systems
- Rated current up to 63 A
- Rated voltage up to 1000 V DC (250 V DC per pole/module)
- Rated short-time withstand current  $I_{cw} = 12 \times I_e, 1 \text{ s}$
- Meet requirements of IEC / EN 60947-3
- Width 1 to 4 modules
- Utilization category DC-22B
- Wide range of accessories

DC isolators Ex9IP can be used as a main switch in photovoltaic and similar applications. These switches are tested according to IEC / EN 60947-3 standards and fulfill also requirements for isolation function.

Ex9IP isolators can be also combined with wide range of accessories including auxiliary and signal contacts, shunt trip and undervoltage releases.

## Type Key



## Certification marks



# DC Rotary Switch Disconnecter **Ex9IR50**



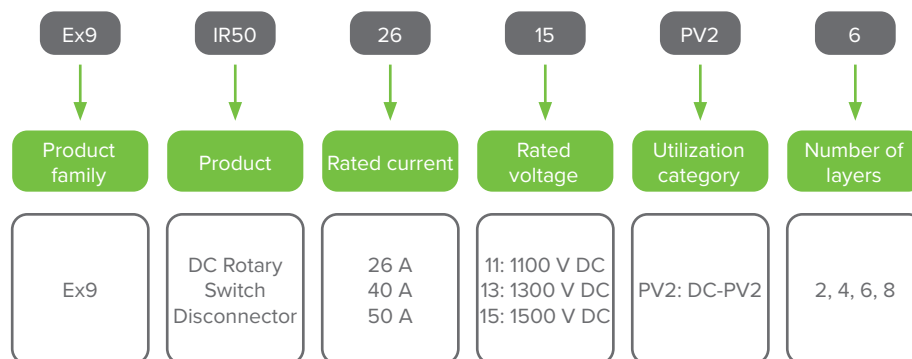
- DC Rotary Switch Disconnecter
- Non-polarized, suitable for PV systems
- Rated current up to 50 A at 1100 V DC
- Rated current up to 26 A at 1500 V DC
- Rated voltage up to 1500 V DC
- Meet requirements of IEC / EN 60947-3
- From 2 up to 8 layers
- Utilization category DC-PV2

Ex9IR50 DC Rotary Switch Disconnecter is an electrical safety device that manually disconnects itself from applications in such as Photovoltaic and energy storage systems. In PV applications this disconnecter is used for manually isolate solar panels for maintenance, installation or repair purposes.

Utilization category is DC-PV2, that means connecting and disconnecting PV circuits where significant over-currents may prevail and where current flow can be in both directions; for example, where several strings are connected in parallel and to the same inverter, or, one or more strings with a battery.

Rated current is up to 50 A for 1100 V DC and 26 A for 1500 V DC in solutions from 2 layers up to 8 layers.

## Type Key



## Certification marks



# Group Change-Over Switches Ex9BT3G



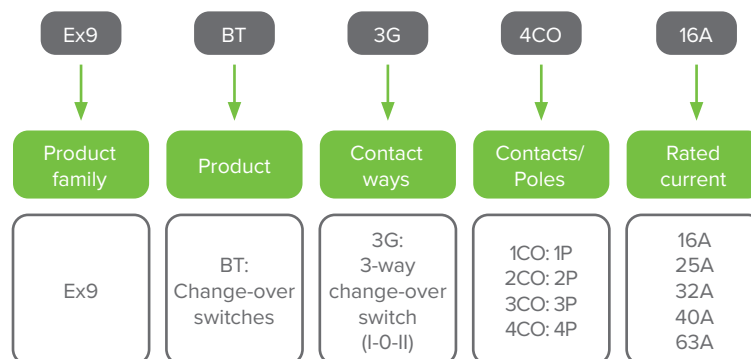
- Group Change-Over Switches
- Meet requirements of IEC / EN 60947-3
- Rated current from 16 A to 63 A
- Rated operating voltage 240/415 V AC
- Utilization category AC-22A
- Contact form ( I-O-II )
- 1 up to 4-pole versions
- Rated frequency 50/60 Hz

Group Change-Over Switches Ex9BT3G are designed and intended for switching of auxiliary, control, measuring and switching networks. Testing according to IEC / EN 60947-3 standard ensures functions and reliability for a wide variety of applications. Utilization category AC-22A allows switching under load.

They are available in variants with change-over contacts (CO) from 1 CO up to 4 CO.

Contact form ( I-O-II ) allows a load to be manually changed from one electrical source to another, without risk of short-circuit.

## Type Key



## Certification marks



# Smart Energy Meters Ex9EMS



- Smart Energy Meters according to IEC / EN 50470-1/3
- MID certification
- Mounting on DIN rails
- Operating voltage  $U_e$  230/400 V AC
- Fixed rated current or adjustable by CT
- 1 or 2-tariff versions
- LCD display
- Optional M-Bus or ModBus communication
- 1, 2 or 4-module width versions
- Infrared eye
- Software and hardware for IR communication

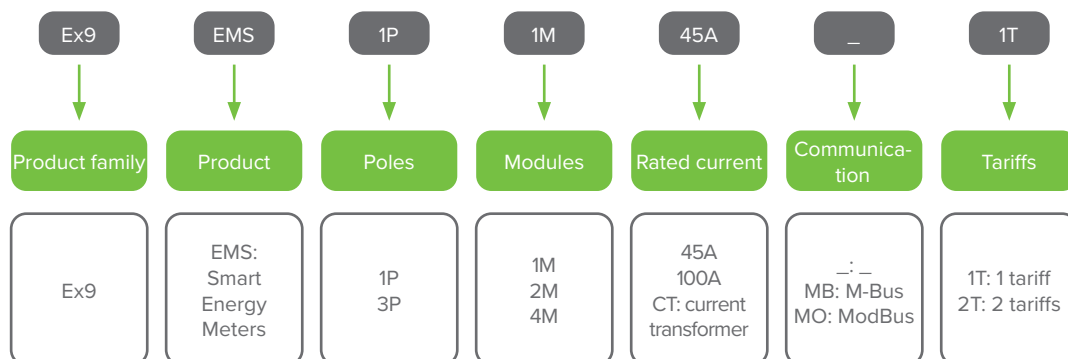
Energy Meters Ex9EMS are smart meters of electric energy. We provide wide range of types with various parameters. Rated current can be fixed or adjustable by Current Transformer. LCD display is a matter of course together with infrared eye for easy read out. Possibility of M-Bus or ModBus communication do from energy meters proper smart device.

Installation Smart Energy Meters Ex9EMS are suitable for residential and industrial applications. The biggest advantage is mounting on DIN rails inside consumer units. They will find their use everywhere where it is needed to count consumed energy.

We offer even cable for IR communication and software can be downloaded from our website.

Energy meters are offered in 1, 2 or 4-modules width versions.

## Type Key



## Certification marks



# Monitoring Relays

## Ex9JP



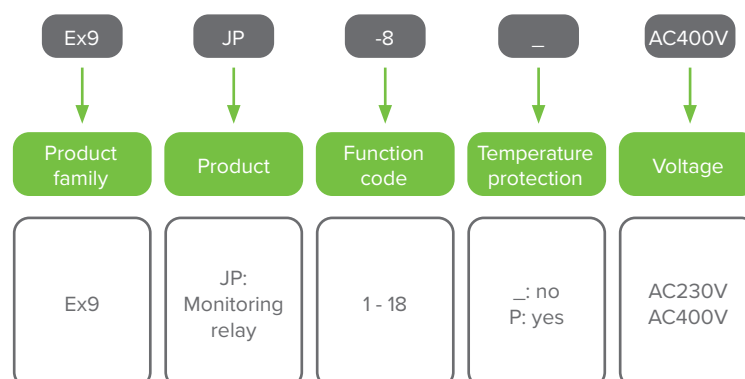
- 3-phase 3-wire or 3-phase 4-wire (with possibility of connection also as 1 or 2 phase)
- Protection against
  - overvoltage
  - undervoltage
  - unbalanced phases
  - phase sequence
  - phase failure
  - overheat
  - load side phase failure
- Delay up to 10 s
- Adjustable or fixed parameters

Monitoring relays Ex9JP are used to provide protection to circuits connected to the power grid. These relays can provide protection against overvoltage, undervoltage, unbalanced phases, phase sequence and phase failure by analyzing voltage on each phase. Temperature control by PTC thermistor in loaded device is optional.

These monitoring relays are provided in various combination of protective functionalities with fixed or adjustable values.

Common application are power control systems, air conditioning systems and several motor applications.

### Type Key



### Certification marks



# Voltage Monitoring Relay

## Ex9JP V-1 3P



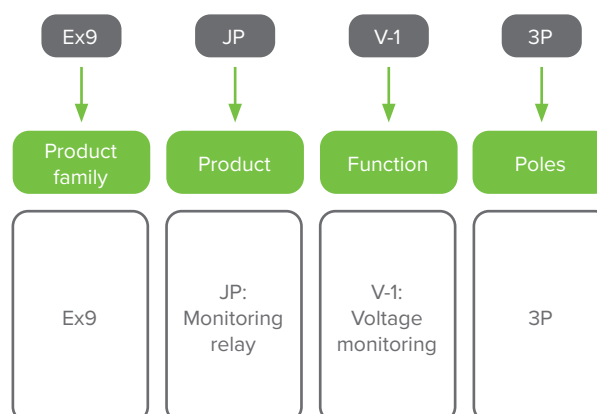
- Voltage Monitoring Relay with LCD display
- 3-phase 3-wire or 3-phase 4-wire connection
- Monitoring of phase
  - sequence
  - failure
  - asymmetry include neutral pole
- Measures real effective value of AC voltage
- Adjustable parameters

The Ex9JP V-1 3P is voltage monitoring relay compatible with 3-phase 3-wire and 3-phase 4-wire systems. It effectively monitors voltage for 3-wire 155-500 V AC or 4-wire 90-228 V AC. The device offers adjustable parameters: upper and lower voltage levels; asymmetry; voltage and frequency hysteresis levels; delay after supply connection.

Operating within a 155–500 V AC supply voltage range, the relay features two changeover contacts, each rated at 5 A/AC1, ensuring reliable performance under varying electrical loads. Adjustments are facilitated via front-panel LCD display with controlling buttons.

Designed for 35 mm DIN rail mounting, the Ex9JP V-1 3P boasts an IP40 front panel and IP20 terminal protection, affirming its suitability for the demanding conditions of industrial environments. This combination of versatility, adjustability, and robust protection makes the Ex9JP V-1 3P a highly effective solution for voltage monitoring and management.

### Type Key



### Certification marks



# Frequency Monitoring Relay **Ex9JP F-1**

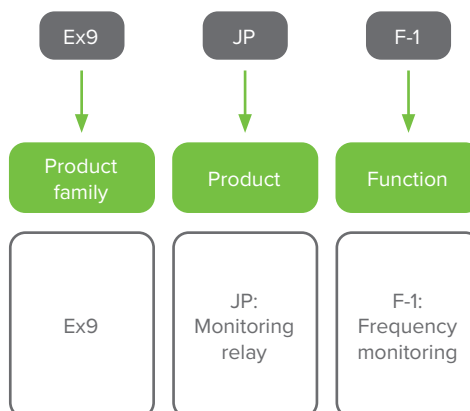


- Monitoring AC frequency of AC voltage in photovoltaic, power stations and generators
- Monitoring frequencies 50/60/400 Hz
- Adjustable parameters
  - $F_{max}$  in the range of 80–120 %  $F_n$
  - $F_{min}$  in the range of 80–120 %  $F_n$
  - difference level in the range of 0.5–5 %  $F_n$
  - delay level in the range of 0.5–10 s

The Ex9JP F-1 is a specialized Frequency Monitoring Relay designed for monitoring AC frequencies in critical applications such as photovoltaic stations and generators. It supports 50/60/400 Hz frequencies and allows adjustable frequency thresholds (80–120% of nominal frequency), providing adaptability for different power systems.

Key features include adjustable difference (0.5–5% of  $F_n$ ) and delay levels (0.5–10 seconds), enabling precise control over frequency variations. The device operates within a 161-500 V AC voltage range and includes 2 change-over contacts, offering flexibility in connections. Its user-friendly design, with front-panel switches for settings adjustments, makes it suitable for complex power monitoring tasks.

## Type Key



## Certification marks



# DC MCCB Switch Disconnectors **Ex9MSD**

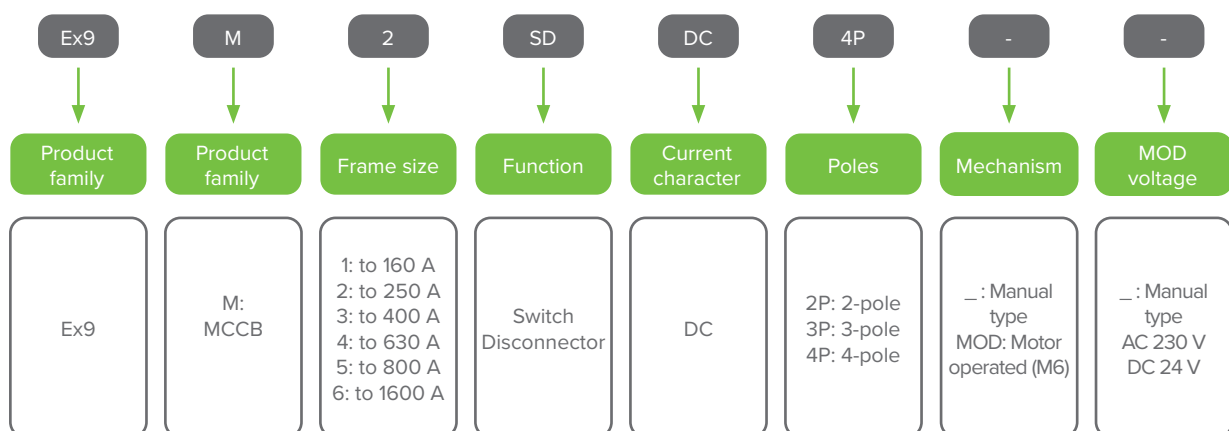


- DC MCCB Switch Disconnectors
- Frame sizes M1-M6
- Rated operating current up to 1600 A
- Tested according to IEC / EN 60947-3
- DC current character
- 2, 3 and 4-pole versions
- Rated voltage 500 V DC (2-pole), 750 V DC (3-pole) and 1000 V DC (4-pole) for Ex9M1SD to Ex9M5SD
- Rated voltage 750 V DC (3-pole) and 1500 V DC (4-pole) for Ex9M6SD

DC versions of MCCB based Switch Disconnectors Ex9MSD are used as a main switch in DC applications, such as PV installations. Testing according to IEC / EN 60947-3 standards ensures functions and reliability for wide variety of applications.

These switch disconnectors follows the same design pattern than their circuit breaker equivalents. Therefore there is possibility to use the fully compatible range of external and internal accessories including extended rotary handles, auxiliary contacts, tripping units and many others.

## Type Key



## Certification marks



# Accessories for Ex9M-HV series



- Accessories for Ex9MHV line devices
- **Motor drive for remote operation**
- Auxiliary contacts synchronous with main contacts
- Signal contacts active on electrical tripping of the circuit breaker (tripping signal contacts)
- Shunt trip and undervoltage releases
- Rotary handles
- Tunnel terminals (1 conductor) and covers
- Mounting depth spacers and adaptors

Accessories suitable for Moulded Case Circuit Breakers Ex9MHV. It is possible to supplement or modify the functions of a basic circuit breaker by installation of suitable accessories.

Circuit breakers can be equipped with auxiliary contacts AX21M (up to 2 units even for M1 frame size) and one unit of signal contact AL21M. AX21M and AL21M are mounted into different positions, a use of one type of the contact does not limit a number of the second type. AX21M and AL21M can be used regardless of the frame size of the circuit breaker.

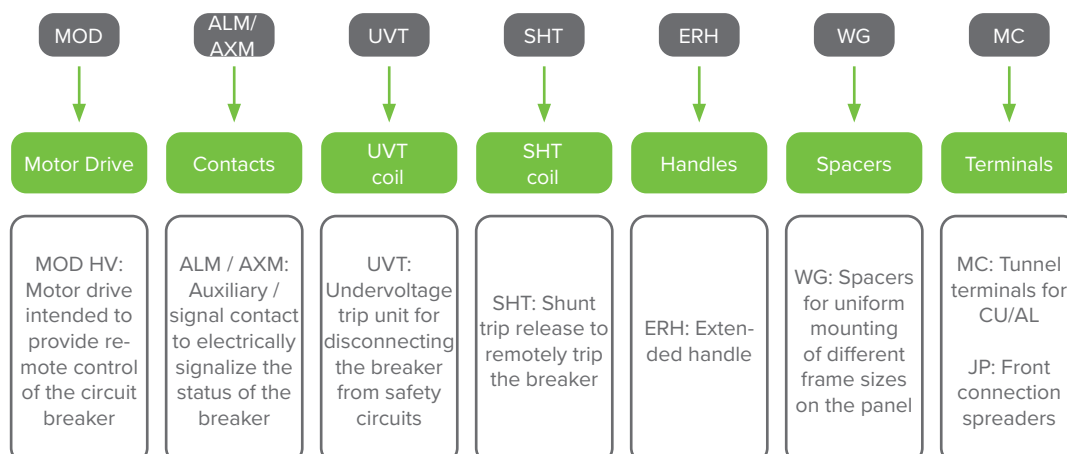
One unit of undervoltage release UVT2i or one unit of shunt trip release SHT2i can be installed in the breaker. Different versions for different frame sizes allow to optimise power consumption of these units.

Circuit breakers can also be equipped with various accessories for toggle operation, including a direct rotary handle, a rotary handle with an extended shaft for door coupling, and a motor operator.

The device can be mounted directly onto a plate using the screws provided in the delivery. To compensate for differences in mounting depth, WG spacers can be used to ensure the front panel aligns evenly with the front plate.

The main conductors connection can be made by the default box terminal type, front connection spreaders JP and tunnel terminals MC.

## Type Key



# IP66 Metal enclosures MHS



- Metal enclosures with high protection degree MHS
- According to IEC / EN 62208 standard
- Variants for surface mounting
- IP66 for single door enclosures, IP55 for double door enclosures
- Fully welded construction
- Light grey RAL 7035 powder coating
- Top and bottom gland plates
- Complementary accessories

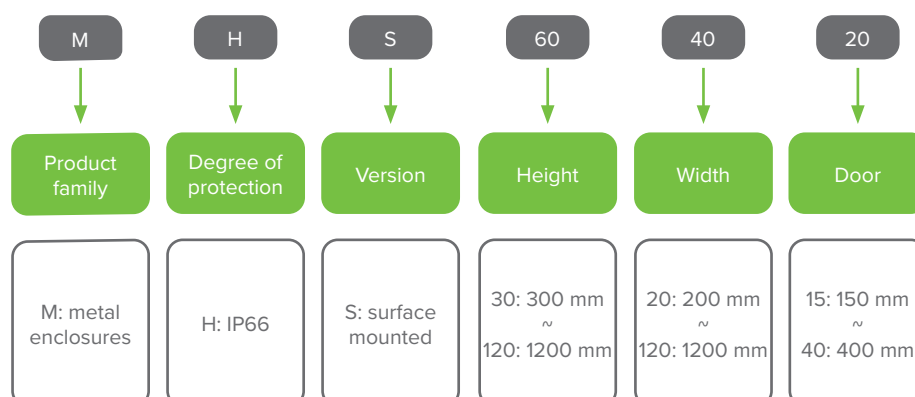
Metal enclosures MHS with mounting plates are surface mounted enclosures suitable mainly for industrial applications where high protection degree (IP) is needed. Protection degree IP66 for single door enclosures and IP55 for double door enclosures.

Usage of quality sheet steel and fully welded construction are the key elements for robustness and rigidity with IK10. Gland plates on bottom and top of enclosure can provide you a maximum possibility of adaptation your application requests. Also due to enclosure symmetry, you can change the position of doors by simply putting it up side down.

We offer complementary accessories as rain canopies, mounting frames for cover plates, cover plates with or without cutout for modules, glazed doors, pole mountings and earthing cables. Spare parts as mounting plates, solid doors and wall brackets you can also find in our portfolio.

In scope of delivery is enclosure, door, mounting plate, gland plates, wall brackets and mounting material.

## Type Key



## Certification marks



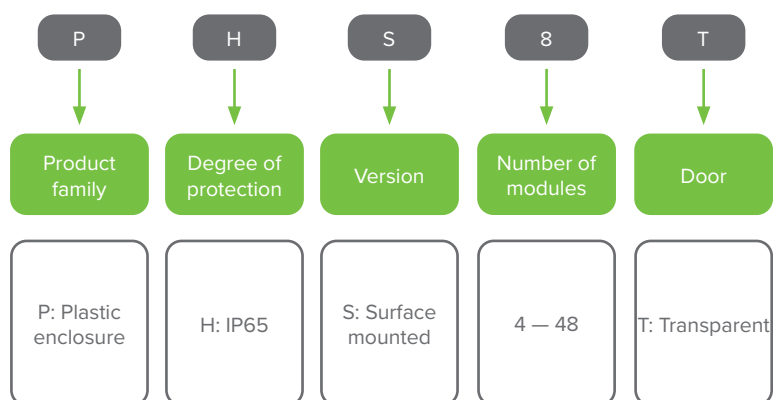
# Surface-mounted IP65 Consumer Units **PHS**



- Surface-mounted consumer units PHS
- Rated oper. voltage 400 V AC, 1500 V DC
- Degree of protection IP65
- 4 up to 48 modules
- 1 up to 4 rows
- Transparent door

Consumer units PHS are intended for general applications including industrial ones with requirements for high degree of IP protection. Their design is suitable for surface mounting. Scope of delivery consists of enclosure, door, device DIN rails, N + PE terminals, front cover with device cutout, cover for empty place, mounting material.

## Type Key



## Certification marks



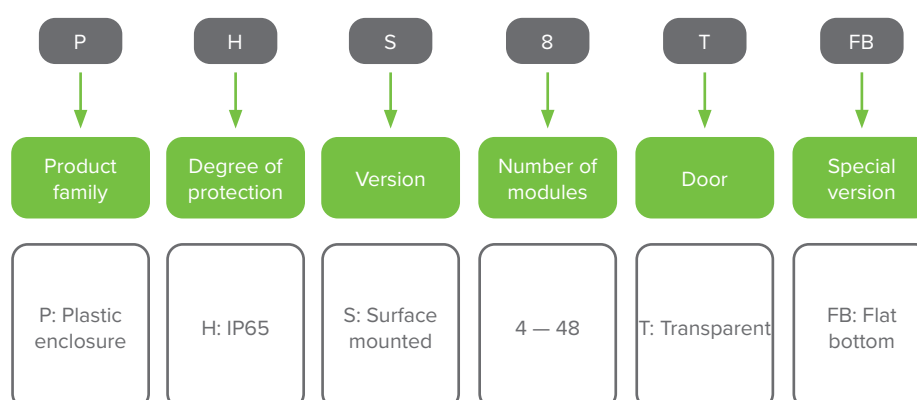
# Surface-mounted IP65 Consumer Units **PHS-FB**



- Surface-mounted consumer units PHS
- Rated oper. voltage 400 V AC, 1500 V DC
- Degree of protection IP65
- Flat bottom - without marked cutouts
- Increased diameter of terminals ( $\Phi$  7.5 mm)
- 4 up to 48 modules
- 1 up to 4 rows
- Transparent door

Consumer units PHS FB are intended for general applications including industrial ones with requirements for high degree of IP protection. Their design is suitable for surface mounting. Flat bottom version features bottom part of the enclosure without marked cutouts and terminal bars with increased diameter of holes for conductors. Scope of delivery consists of enclosure, door, device DIN rails, N + PE terminals, front cover with device cutout, cover for empty place, mounting material.

## Type Key



## Certification marks



# PORTFOLIO HIGHLIGHTS



# DC Switch Disconnecter Ex9IZ



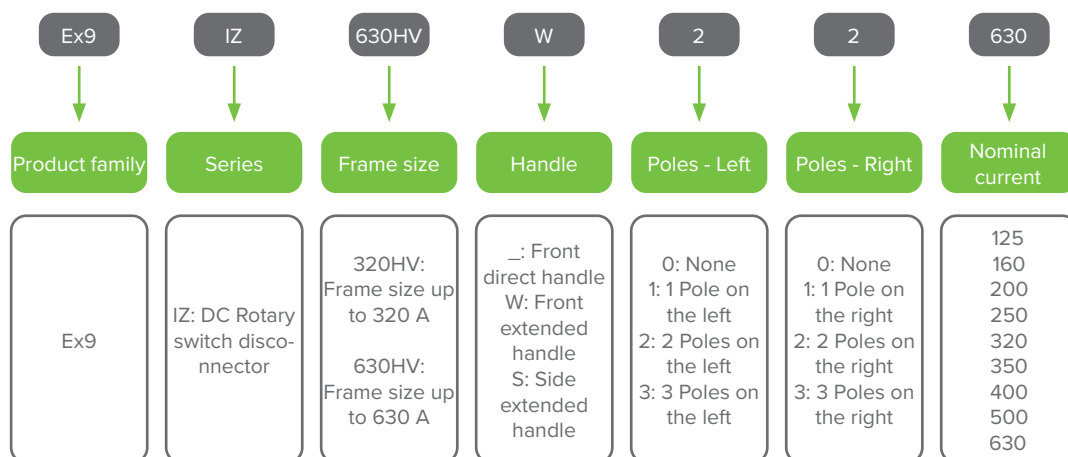
- Switch-Disconnecter designed for isolating and load breaking of DC electrical circuits
- Rated current up to 630 A
- Rated voltage up to 1500V DC
- Rated  $I_{cw}$  current up to 10 kA / 1s
- Rated  $I_{cm}$  current up to 10 kA
- Meet requirements of IEC / EN 60947-3
- 2, 4 and 6-pole versions
- Utilization category DC-21B, DC-22B, DC-PV1, DC-PV2

Ex9IZ HV Series of rotary switch disconnectors is designed as a load-breaking isolating switch in electrical installations focused in applications such as Photovoltaic and Battery Energy Storage Systems. In PV applications, this disconnecter is used for manual isolation of the DC side from the rest of the system for maintenance, commissioning or service purposes.

Being in accordance with the Utilization categories DC-21B, DC-22B, DC-PV1 and DC-PV2 ensures safe connecting and disconnecting of DC circuits in a wide variety of conditions. This product is intended to be installed inside of service boxes, PV String boxes, and into BESS protection panels as a main load switch.

Rated current is up to 630 A at 1500V DC to fit the newest demands of the industry in a compact and reliable shape.

## Type Key



## Certification marks



# DC MCCBs Ex9MV2S-PV



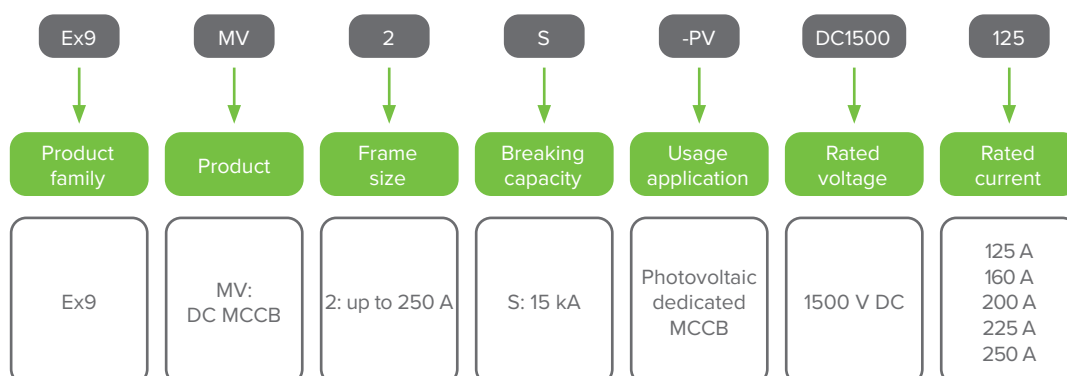
- DC Moulded Case Circuit Breakers suitable for photovoltaic applications
- Frame size M2
- Rated current up to 250 A
- Rated ultimate short circuit breaking capacity  $I_{cu} = 15 \text{ kA}$ ,  $I_{cs} = 100 \% I_{cu}$
- Rated voltage 1500 V DC
- Thermomagnetic releases
- Fixed version

DC Moulded Case Circuit Breakers Ex9MV2S-PV are intended mainly for photovoltaic applications. Testing according to IEC / EN 60947-2 standards ensures functions and reliability for wide variety of applications including isolation.

These breakers are offered with breaking capacity of 15 kA. Rated impulse withstand voltage  $U_{imp}$  12 kV makes it possible to use them even in systems with occurrences of transient overvoltage waves of high intensity.

Utilization category A.

## Type Key



## Certification marks



# DC Moulded Case Circuit Breakers **Ex9MD3HV**

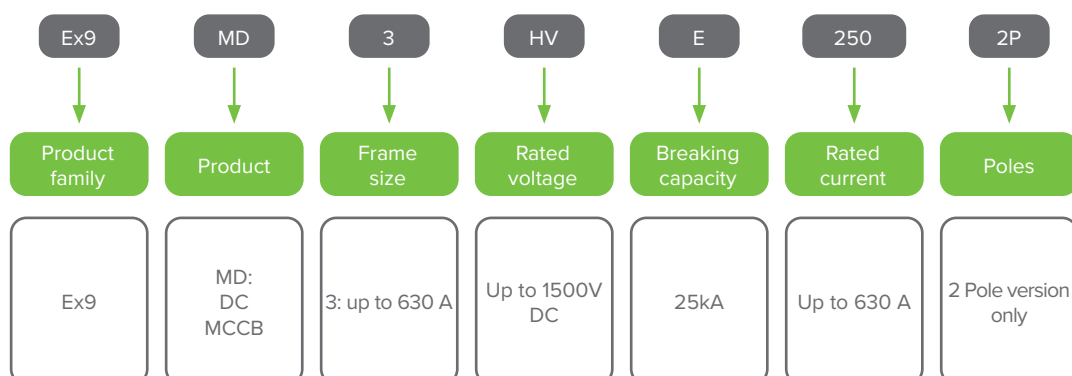
- DC Moulded Case Circuit Breakers suitable for photovoltaic applications
- Frame size M3
- Rated current up to 630 A
- Rated ultimate short circuit breaking capacity  $I_{cu} = 25 \text{ kA}$
- Rated voltage 1500 V DC
- Thermomagnetic releases

The HV DC Moulded Case Circuit Breakers are intended mainly for photovoltaic applications. Testing according to IEC / EN 60947-2 standards ensures functions and reliability for wide variety of applications including isolation.

These breakers are offered with breaking capacity of 25 kA. Rated impulse withstand voltage  $U_{imp} 12 \text{ kV}$  makes it possible to use them even in systems with occurrences of transient overvoltage waves of high intensity.

Utilization category A.

## Type Key



## Certification marks



# DC Air Switch Disconnecter Ex9ASD



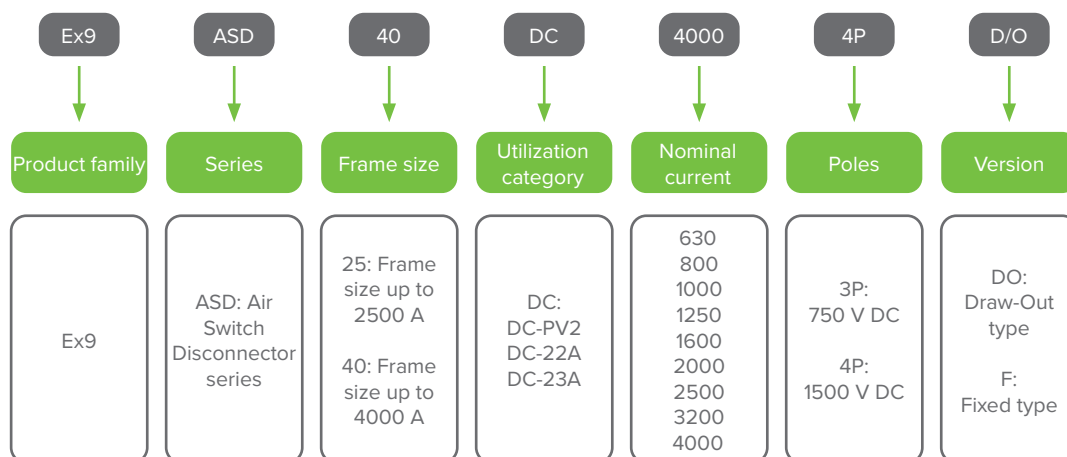
- DC Air Switch Disconnecter
- Rated current from 630 A to 4000 A
- Rated voltage up to 1500 V DC
- Rated  $I_{cw}$  current up to 100 kA / 1s
- Rated  $I_{cm}$  current up to 60 kA
- Meet requirements of IEC / EN 60947-3
- Wide variety of accessories for improved functionality
- Utilization category DC-22A, DC-23A, DC-PV2

Ex9ASD are the standard Air Switch Disconnectors series specifically designed as a main switch in electrical installations focused in applications such as Photovoltaic and energy storage systems. In PV applications this disconnecter is used to manually isolate the DC side from the rest of the system for maintenance, commissioning or service purposes.

Compliance with utilization categories DC-PV2, DC-22A, and DC-23A ensures safe and frequent connection and disconnection of DC circuits where significant resistive and inductive overcurrents may occur, and where the current flow can be bidirectional. This applies, for example, to the safe remote disconnection of a DC battery source in a Power Conversion System (PCS).

Rated current is up to 4000 A at 1500 V DC to fit the highest and newest demands of the industry.

## Type Key



## Certification marks



# DC Compact Air Switch Disconnecter **ExASD E 25 2P**



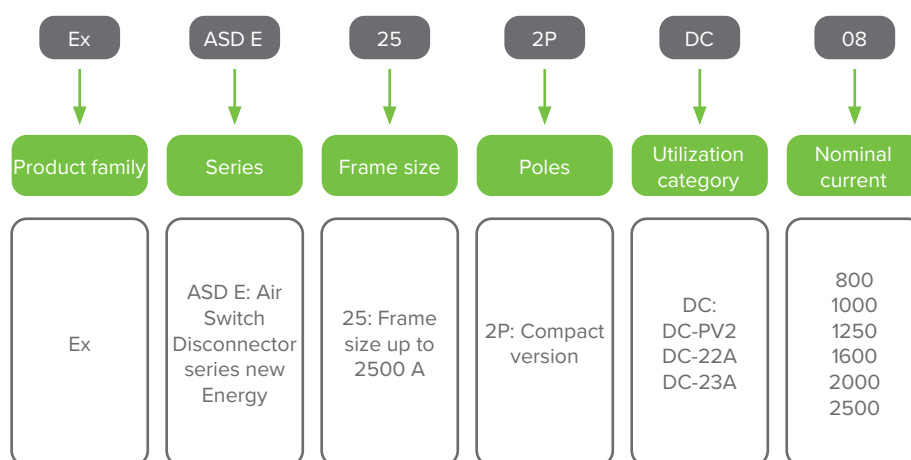
- DC Compact Air Switch Disconnecter
- Rated current from 800 A to 2500 A
- Rated voltage up to 1500 V DC
- Rated  $I_{cw}$  current up to 150 kA / 0.2s
- Rated  $I_{cm}$  current up to 60 kA
- Meet requirements of IEC / EN 60947-3
- Wide variety of accessories for improved functionality
- Utilization category DC-PV2

ExASD E are the standard Air Switch Disconnectors series specifically designed as a main switch in electrical installations focused in applications such as Photovoltaic and Battery Energy Storage Systems. In PV applications this disconnecter is used to manually isolate the DC side from the rest of the system for maintenance, commissioning or service purposes.

Being in accordance with the Utilization category DC-PV2, ensures a safe connecting and disconnecting PV DC circuits where significant overcurrents may prevail and where current flow can be in both directions; for example, safety remote disconnection of the DC battery source in a Power Conversion System PCS.

Rated current is up to 2500 A at 1500 V DC to fit the newest demands of the industry in the most compact size making it suitable for any OEM requirement.

## Type Key



## Certification marks



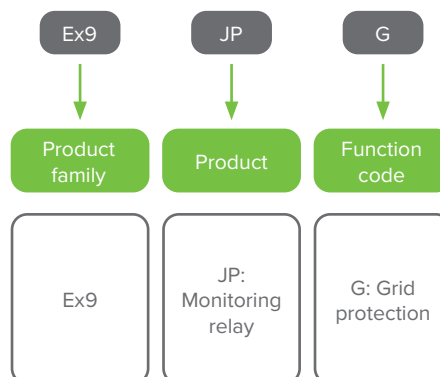
# Monitoring relay **Ex9JP-G**



- Operational voltage 110 V - 230 V AC/24 V DC (L+N)
- Protection functions: undervoltage, overvoltage, underfrequency, overfrequency and more
- FRT capability
- Monitoring of 1 and 3-phase grids for low and medium voltage
- Single-fault tolerance
- Cyclical self-test
- 5 Digital inputs available
- Country specific parameter sets or Open setup

The monitoring relay Ex9JP-G is mainly used in photovoltaic installations for monitoring and protection to circuits connected to the power grid. This relay can provide protection against overvoltage, undervoltage, unbalanced phases, phase sequence and phase failure by analyzing voltage on each phase. It offers various combinations of protective functionalities with adjustable values for country specific standards or open setup.

## Type Key



## Certification marks



# AC Switch Disconnecter Ex9I HV



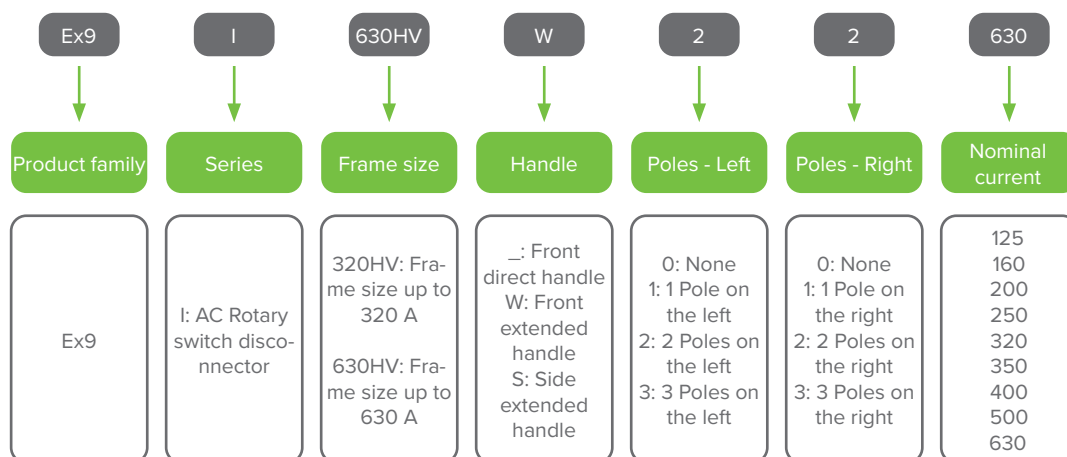
- Switch-Disconnecter designed for isolating and load breaking of AC electrical circuits
- Rated current up to 630 A
- Rated voltage up to 1140 V AC
- Rated  $I_{cw}$  current up to 10 kA / 1s
- Rated  $I_{cm}$  current up to 17 kA
- Meet requirements of IEC / EN 60947-3
- 3 and 4-pole versions
- Utilization category AC-21A, AC-22A, AC-23A

Ex9I HV Series of rotary switch disconnectors is designed as an AC load-breaking isolating switch in electrical installations focused in applications such as Photovoltaic and AC generation systems. In PV applications, this disconnecter is used to manually isolate the AC output of the string inverters side from the rest of the system for maintenance, commissioning or service purposes.

Compliance with utilization categories AC-21A, AC-22A, and AC-23A ensures safe and frequent switching of AC circuits, even under significant resistive and inductive loads. This product is intended to be installed inside of service boxes, PV strings boxes, and other protection panels as a main load switch.

Rated current is up to 630 A at 1140 V AC to fit the and newest demands of the industry in a compact and reliable shape.

## Type Key



## Certification marks



# Moulded Case Circuit Breakers

## Ex9MHV AC M



- Tested according to IEC/EN 60947-2
- Magnetic only tripping unit for power distribution
- Frame sizes M2-M3
- Rated operating current from 63 A up to 630 A
- 3 pole versions
- Rated ultimate short circuit breaking capacity  $I_{cu}$  up to 50 kA
- Rated voltage 690 / 800 / 1000 / 1140V AC

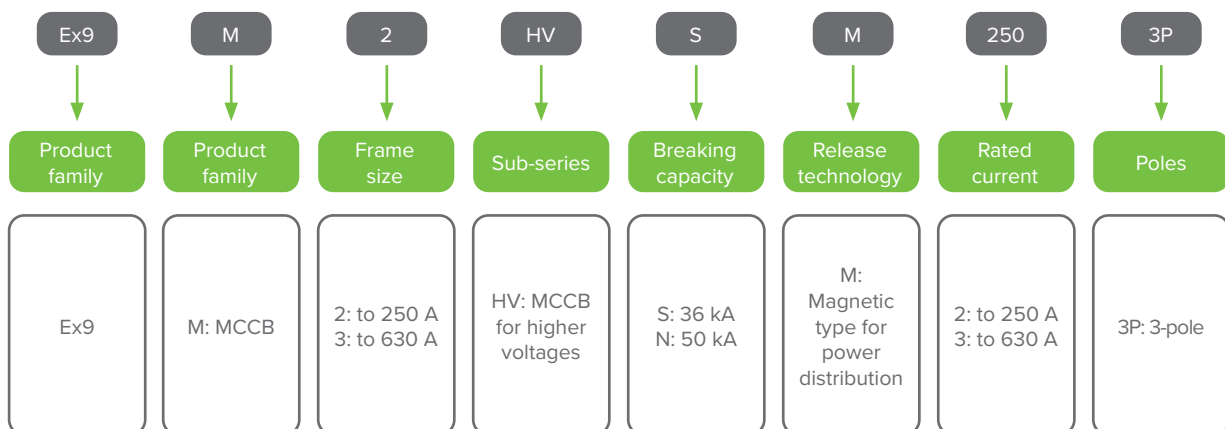
Moulded Case Circuit Breakers Ex9MHV Magnetic (M) type are intended for applications in power distribution with nominal voltages up to 1140V AC. These breakers are based on the regular Ex9M series and are developed to provide all the required protections to installation with an unusual higher voltage, for example: 800V AC photovoltaic installations.

Testing according to IEC/EN 60947-2 standards ensures the functionality and reliability for wide variety of applications including isolation.

These breakers are offered with breaking capacities from 36 kA up to 50 kA at 800V AC. High rated impulse withstand voltage makes it possible to use them even in system with occurrences of transient overvoltage waves of high intensity, e.g. in heavy industry.

Utilization category A circuit breakers.

### Type Key



### Certification marks



# Moulded Case Circuit Breakers

## Ex9MHV AC TM



- Tested according to IEC / EN 60947-2
- Thermo-magnetic only tripping unit for power distribution
- Frame sizes M2-M3
- Rated operating current from 63 A up to 630 A
- 3 pole versions
- Rated ultimate short circuit breaking capacity  $I_{cu}$  up to 50 kA
- Rated voltage 690 / 800 / 1000 / 1140V AC

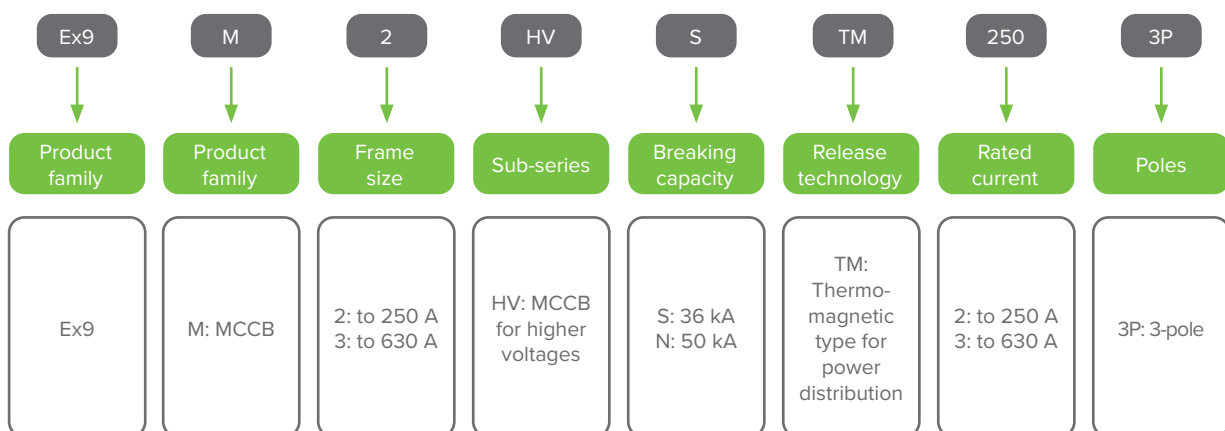
Moulded Case Circuit Breakers Ex9MHV Thermo-magnetic (TM) type are intended for applications in power distribution with nominal voltages up to 1140V AC. These breakers are based on the regular Ex9M series and are developed to provide all the required protections to installation with an unusual higher voltage, for example: 800V AC photovoltaic installations.

Testing according to IEC / EN 60947-2 standards ensures the functionality and reliability for wide variety of applications including isolation.

These breakers are offered with breaking capacities from 36 kA up to 50 kA at 800V AC. High rated impulse withstand voltage makes it possible to use them even in system with occurrences of transient overvoltage waves of high intensity, e.g. in heavy industry.

Utilization category A circuit breakers.

### Type Key



### Certification marks



# Air Circuit Breakers

## Ex9A25HU up to 2500 A



- Air circuit breakers, frame size A25
- Rated current up to 2500 A
- Rated operating voltage 800 / 1000 / 1150V AC
- Breaking capacity  $I_{cu}$  65 kA
- Fixed and withdrawable versions
- Utilization category B acc. to IEC / EN 60947-2
- Compact and modular design
- Wide range of accessories

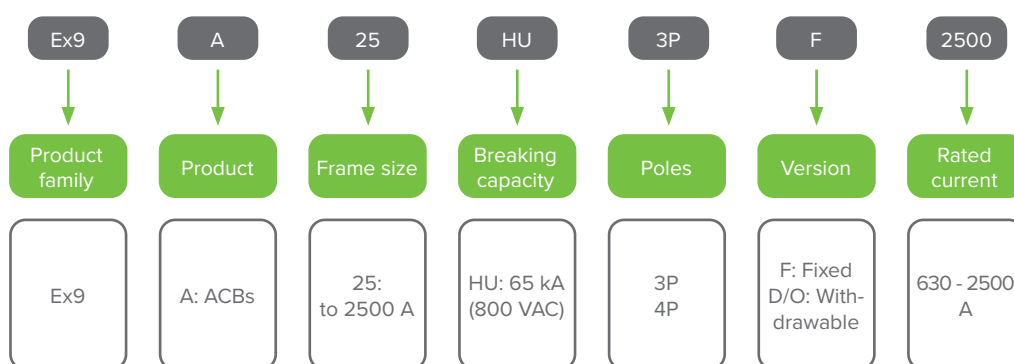
Air Circuit Breakers from Ex9A series are designed for power distribution protection on high demand installations such as industrial and commercial among others. Testing according IEC / EN 60947-2 standards ensures the required functionality and reliability for the higher power applications.

The Ex9A25-HU version has been developed to fit into the newest demands of the PV applications on which the nominal voltage keeps increasing. These products has been rated from 800V AC up to 1150V AC.

In order to provide the best control and monitoring features, the Ex9A25HU is offered with the most advanced SU4.0H, capable of detecting ground leakages and able to react to current, voltages, powers and harmonics failures by disconnecting the breaker or alerting to the system via programmable DO or Modbus.

Utilization category B circuit breakers.

### Type Key



### Certification marks



# Air Circuit Breakers

## Ex9A40HU up to 4000 A



- Air circuit breakers, frame size A40
- Rated current up to 4000 A
- Rated operating voltage 800 / 1000 / 1150 V AC
- Breaking capacity  $I_{cu}$  of 75 kA
- Fixed and withdrawable versions
- Utilization category B acc. to IEC / EN 60947-2
- Compact and modular design
- Wide range of accessories

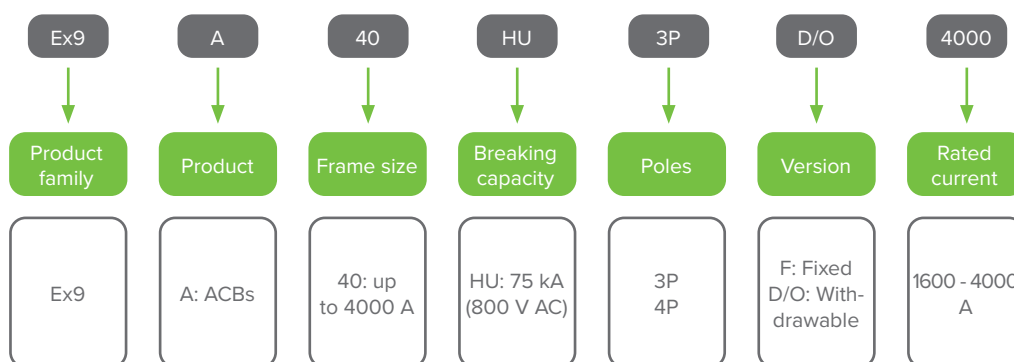
Air Circuit Breakers from Ex9A series are designed for power distribution protection on high demand installations such as industrial and commercial among others. Testing according IEC / EN 60947-2 standards ensures the required functionality and reliability for the higher power applications.

The Ex9A40-HU version has been developed to fit into the newest demands of the PV applications on which the nominal voltage keeps increasing. These products has been rated from 800 V AC up to 1150 V AC.

In order to provide the best control and monitoring features, the Ex9A40HU is offered with the most advanced SU4.0H, capable of detecting ground leakages and able to react to current, voltages, powers and harmonics failures by disconnecting the breaker or alerting to the system via programmable DO or Modbus.

Utilization category B circuit breakers.

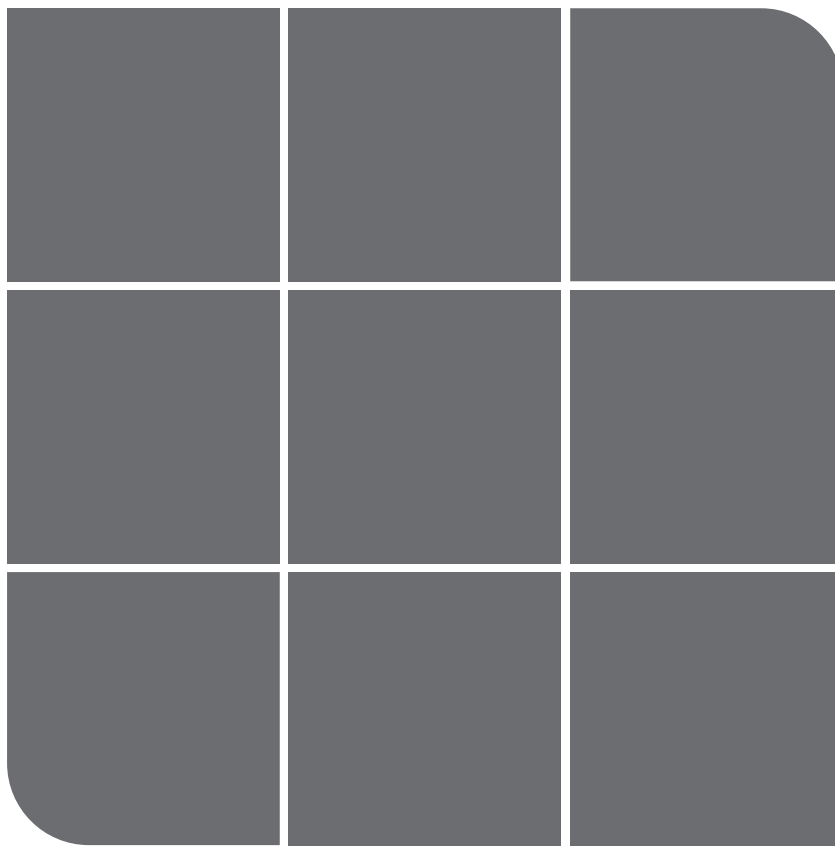
### Type Key



### Certification marks



# NOARK



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#wearenoark