

# PV Product Catalogue

**noark**

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Moulded Case Circuit Breaker  
Ex9MD Series Circuit Breaker



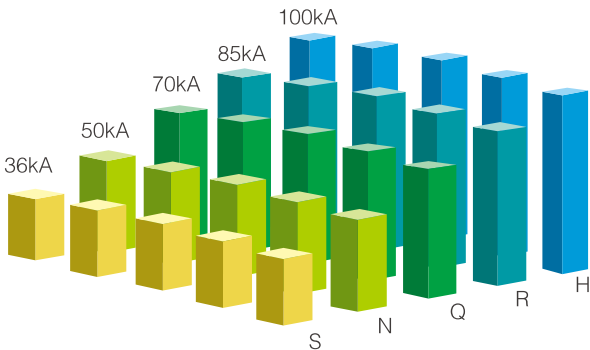
Ex9MD1 Ex9M1SD	Ex9MD2 Ex9M2SD	Ex9MD3 Ex9M3SD	Ex9MD4 Ex9M1SD	Ex9MD5 Ex9M5SD
↓	↓	↓	↓	↓
125A	250A	400A	630A	800A



CB



Standard type - S and N  
High-breaking capacity type - Q, R and H



Model	Rated current (A)																					
	16	20	25	32	40	50	63	80	100	125	160	180	200	225	250	315	350	400	500	630	700	800
Ex9MD1	■	■	■	■	■	■	■	■	■	■												
Ex9MD2										■	■	■	■	■	■							
Ex9MD3															■	■	■	■				
Ex9MD4																		■	■	■		
Ex9MD5																				■	■	■

- Note:
- Ex9MD1 is adjustable for thermal protection, range: 0.8-1.0 In
  - Ex9MD2 is adjustable for thermal and magnetic protection, range: 0.8-1.0 In, 5-10 In
  - Ex9MD3, Ex9MD4 and Ex9MD5 are the same as Ex9MD2



Ex9MD DC Moulded Case Circuit Breaker

Ex9MD	1	S	TM	DC	125	3P
Product Code	Rated Frame Current Code	Breaking Capacity Code	Tripping device code	AC/DC Code	Rated Current (A)	Poles
Ex9MD:DC Protection	1:125A 2:250A 3:400A 4:630A 5:800A	B:25kA  S:36kA  N:50kA  Q:70kA  R:85kA  H:100kA	TM: Thermomagnetic , for protection of general power distribution	DC: Direct current	125, 100, 80, 63, 50, 40, 32, 25, 20, 16  250, 225, 200, 180, 160, 125  400,350, 315,250  630,500,400  800,700,630	2P ①  3P  4P4T: Neutral protected, on-and -off ②  4P4I: Neutral protected, without on-and -off ②  4P4U: Neutral unprotected, on-and -off ②  4P4N: Neutral unprotected, without on-and -off ②

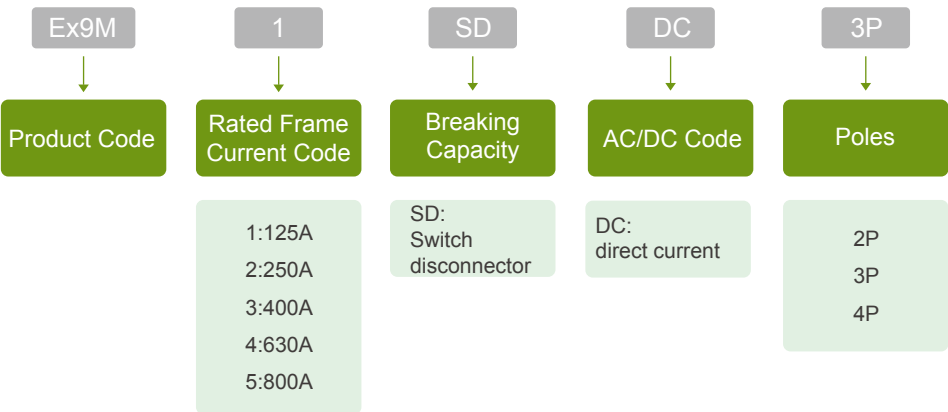
Example:

"Ex9MD1 S TM DC125 3P": means DC Moulded Case Circuit Breaker of the Ex9M series, frame current 125A, breaking capacity 36kA, 3 poles, rated current 125A with thermal-magnetic distribution protection trip unit.

Note: ①:2P only for Ex9MD1, Ex9MD2  
②:Special Product – Please contact NOARK before placing an order



## Ex9MSD Switch disconnect






**Example:**  
Ex9M1SD DC 3P: means an Ex9MSD switch disconnect, frame current 125A, DC, 3 poles.

# Moulded Case Circuit Breaker

Ex9MD Series Circuit Breaker






## Parameters

Ex9MD Series DC Circuit Breaker			Ex9MD1						Ex9MD2						
For PV system															
Number of poles			2P/3P/4P						2P/3P/4P						
Rated frame current (A)			125						250						
Electrical performance															
Rated working voltage (V)		U <sub>e</sub>	500/750/1000						500/750/1000						
Rated current (A)		I <sub>n</sub>	16-20-25-32-40-50-63-80-100-125						125-160-180-200-225-250						
Rated insulation voltage (V)		U <sub>i</sub>	1000						1000						
Rated impulse withstand voltage (kV)		U <sub>imp</sub>	8						8						
Type of breaking			B	S	N	Q	R	H	B	S	N	Q	R	H	
Ultimate breaking capacity (kA)		I <sub>cu</sub> 1000V DC	25	36	50	70	85	100	25	36	50	70	85	100	
Service breaking capacity (% I <sub>cu</sub> )		I <sub>cs</sub>	100%						100%						
Isolation function			■						■						
Utilization category			A						A						
Service life (C-O cycle)	Mechanical	Actual mean value	15000						15000						
		Test value	7000						7000						
	Electrical	Actual value	5000						5000						
		Standard value	1000						1000						
Protection															
Thermomagnetic		Long-time delay	(0.8-0.9-1.0)×I <sub>n</sub>						(0.8-0.9-1.0)×I <sub>n</sub>						
		Short-time delay	—						—						
		Instantaneous	10×I <sub>n</sub>						(5-6-7-8-9-10)×I <sub>n</sub>						
Control and indication															
Control mode	Manual	Direct(RHD)	□						□						
		Extended(ERH)	□						□						
	Motor mechanism(MOD)		□						□						
Shunt release(SHT)			□						□						
Under-voltage release(UVT)			□						□						
Auxiliary contact(AX)			□						□						
Alarm contact(AL)			□						□						
Connection and installation															
Degree of protection		All sides	IP40						IP40						
		Wiring terminal	IP20						IP20						
		Wiring assembly	Front/rear						Front/rear						
Wiring	Plug-in base(PIA)		□						□						
	Draw-out base(DOB)		—						—						
Shorted row(DCB)			■						■						
Key lock(KLK)			ON/OFF position						ON/OFF position						
Phase shield(PHS)			■						■						
Mechanical interlock(MIT)			□						□						
External dimensions (mm)			a(2*/3/4)	62/90/120					70/105/140						
			b	140					157						
			c	81.6					91.5						
Weight (kg) (Fixed before connection)	2P		0.9						1.2						
	3P		1.2						1.7						
	4P		1.7						2.2						

■standard □Optional — None

\* Only Ex9MD1 Ex9MD2 have 2 P; 500V for 2 poles in series connection, 750V for 3 poles in series connection, 1000V for 4 poles in series connection




Ex9MD3							Ex9MD4							Ex9MD5						
																				
3P/4P							3P/4P							3P/4P						
400							630							800						
750/1000							750/1000							750/1000						
250-315-350-400							400-500-630							630-700-800						
1000							1000							1000						
8							8							8						
B	S	N	Q	R	H		B	S	N	Q	R	H		B	S	N	Q	R	H	
25	36	50	70	85	100		25	36	50	70	85	100		25	36	50	70	85	100	
100%							100%							100%						
■							■							■						
A							A							A						
10000							10000							5000						
4000							4000							2500						
2000							2000							1000						
1000							1000							500						
(0.8-0.9-1.0)×I <sub>n</sub>							(0.8-0.9-1.0)×I <sub>n</sub>							(0.8-0.9-1.0)×I <sub>n</sub>						
—							—							—						
(5-6-7-8-9-10)×I <sub>n</sub>							(5-6-7-8-9-10)×I <sub>n</sub>							(5-6-7-8-9-10)×I <sub>n</sub>						
□							□							□						
□							□							□						
□							□							□						
□							□							□						
□							□							□						
□							□							□						
□							□							□						
IP40							IP40							IP40						
IP20							IP20							IP20						
Front/rear							Front/rear							Front/rear						
□							—							—						
□							□							□						
■							■							■						
ON/OFF position							ON/OFF position							ON/OFF position						
■							■							■						
□							□							□						
140/185							195/260							195/260						
255							300							300						
118.5							142							142						
—							—							—						
5.0							10.2							10.2						
6.6							13.5							13.5						

# Moulded Case Circuit Breaker

Ex9MD Series Circuit Breaker





## Parameters

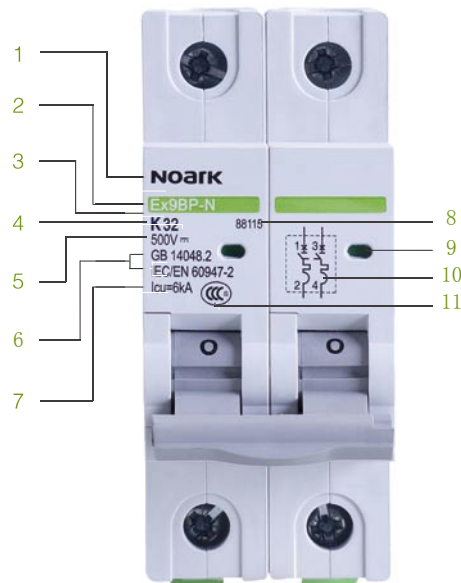
Ex9M Series Switch Disconnector			Ex9M1SD		Ex9M2SD		
Switch disconnector							
Number of poles			2P/3P/4P		2P/3P/4P		
Rated frame current (A)			125		250		
Electrical performance							
Working frequency(Hz)		f	50/60		50/60		
Rated operational voltage (V)Ue		AC	380/400/415/660/690		380/400/415/660/690		
		DC	500/750/1000		500/750/1000		
Rated working current(A) In		AC	125		250		
		DC	125		250		
Rated insulation voltage(V)		Ui	1000		1000		
Rated impulse withstand voltage		U <sub>imp</sub>	8		8		
Rated shorttime withstand current (A)		1s	1800		3200		
		3s	1800		3200		
		20s	700		1350		
Isolation function			■		■		
Utilization type		AC	AC22A/AC23A		AC22A/AC23A		
		DC	DC22A/DC23A		DC22A/DC23A		
Service life (C-O)	Mechanical	Actual mean value	15000		15000		
		Test value	7000		7000		
	Electrical	Actual value	5000		5000		
		Standard value	1000		1000		
Control and indication							
Control mode	Manual	Direct(RHD)	□		□		
		Extended(ERH)	□		□		
	Motor mechanism(MOD)		□		□		
Shunt release(SHT)			□		□		
Under-voltage release(UVT)			□		□		
Auxiliary contact(AX)			□		□		
Alarm contact(AL)			□		□		
Connection and installation							
Degree of protection		All sides	IP40		IP40		
		Wiring terminal	IP20		IP20		
Wiring		Wiring assembly	Front/Rear		Front/Rear		
		Plug-in base(PIA)	□		□		
		Draw-out base(DOB)	—		—		
Terminal shield(TCV)		Front	□		□		
		Rear	—		—		
Key lock(KLK)			ON/OFF position		ON/OFF position		
Phase shield(PHS)			■		■		
Mechanical interlock(MIT)			□		□		
External dimensions (mm) W × H × D			a(2*/3/4)	62/90/120		70/105/140	
			b	140		157	
			c	81.6		91.5	
Weight (Kg) (Fixed before connection)		2P	0.6		1.1		
		3P	1.0		1.5		
		4P	1.5		2.0		

■ standard □Optional — None \* Only Ex9M1SD, Ex9M2SD have 2 P; 500V for 2 poles in series connection, 750V for 3 poles in series connection, 1000V for 4 poles in series connection



	Ex9M3SD	Ex9M4SD	Ex9M5SD
			
	3P/4P	3P/4P	3P/4P
	400	630	800
	50/60	50/60	50/60
	380/400/415/660/690	380/400/415/660/690	380/400/415/660/690
	750/1000	750/1000	750/1000
	400	630	800
	400	630	800
	1000	1000	1000
	8	8	8
	5000	8000	10000
	5000	8000	10000
	2400	3000	3800
	■	■	■
	AC22A/AC23A	AC22A/AC23A	AC22A/AC23A
	DC22A/DC23A	DC22A/DC23A	DC22A/DC23A
	10000	5000	5000
	4000	4000	2500
	2000	2000	2000
	1000	1000	500
	□	□	□
	□	□	□
	□	□	□
	□	□	□
	□	□	□
	□	□	□
	□	□	□
	IP40	IP40	IP40
	IP20	IP20	IP20
	Front/Rear	Front/Rear	Front/Rear
	□	—	—
	□	□	□
	□	□	□
	—	—	—
	ON/OFF position	ON/OFF position	ON/OFF position
	■	■	■
	□	□	□
	140/185	195/260	195/260
	255	300	300
	118.5	142	142
	—	—	—
	4.5	9.5	9.5
	6.0	12.7	12.7

Appearance



- 1 Brand
- 2 Type
- 3 Rated current
- 4 Tripping type
- 5 Rated voltage
- 6 Conformed Standards
- 7 Rated breaking capacity
- 8 Ordering code
- 9 Indicator
- 10 Electrical diagram
- 11 Signal of certificate

Characteristics

Instantaneous tripping type

- Curve C
  - Protection for low PV module perceptual load and photovoltaic line system
  - Rated current: 1~63A(30℃)
  - Tripping characteristic: instantaneous tripping range(7-14)In
- Curve K
  - Protection for high PV module perceptual load and photovoltaic line system, and have a higher impact resistant current ability
  - Tripping characteristic: instantaneous tripping range(14-20)In
  - \* For the detail of tripping curve, please refer to appendix

Features

The product can realize non-polarity wiring, and ensure the safety of equipment

Conformed standards

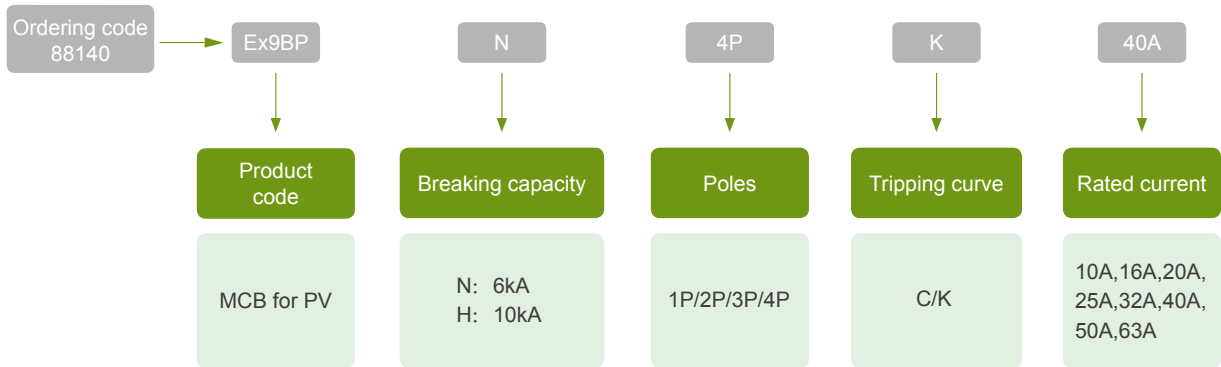
IEC / EN60898-1

Altitude

Ex9BP Series products have passed the high-altitude test and the test data are as follows.





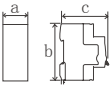
Altitude(m)	2000	3000	4000	5000
Dielectric(V DC)	3110	2799	2550.2	2332.5
Max working voltage for 4P tandem connection (VDC)	1000	900	820	750
40℃ thermal rating(A)	1×In	0.96×In	0.93×In	0.9×In
Rated impulse withstand voltage Uimp(kV)	4	3.6	3	2.2

Selection Guide



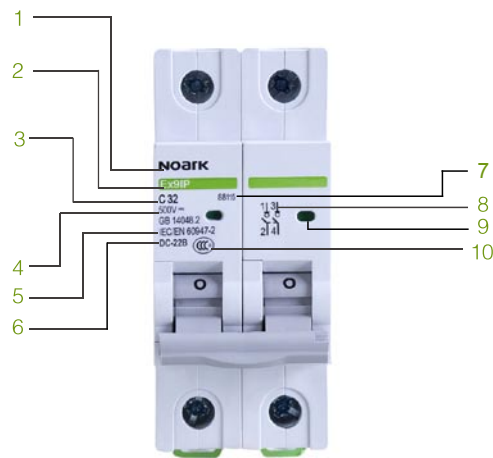


## Parameters

MCB Ex9BP for PV						
For PV system only (IEC/EN 60947-2)						
Poles			1P	2P	3P	4P
Rated frame current (A)			63			
Electrical performance						
Rated working voltage	U <sub>e</sub>	V DC	250	500	750	1000
Rated current	I <sub>n</sub>	A	10,16,20,25,32,40,50,63			
Rated insulated voltage	U <sub>i</sub>	V	1000			
Rated implused voltage	U <sub>imp</sub>	kV	4			
Type of breaking			N/H			
Ultimate breaking capacity			6/10			
Service breaking capacity (%Icu)			100%			
Curve type			C/K			
Tripping type			Thermal magnetic type			
Service life (C-O)	Mechanica	Actual value	20000			
		Standard value	8500			
	Electrical	Actual value	10000			
		Standard value	1500			
Control and indication						
Auxiliary contact			<input type="checkbox"/>			
Alarm contact			<input type="checkbox"/>			
Shunt release			<input type="checkbox"/>			
Undervoltage release			<input type="checkbox"/>			
Overvoltage release			<input type="checkbox"/>			
Connection and installation						
Protection degree	All sides		IP40			
	Connection terminal		IP20			
Padlock			ON/OFF position			
Wire	mm <sup>2</sup>		1~35			
Working temperature			-30~+70			
Resistance to humidity and heat			Class 2			
Altitude above sea			≤2000			
Relative humidity			+20℃，≤95%; +40℃，≤50%			
Pollution degree			3			
Installation environment			Avoid obvious shock and vibration			
Installation class			Class III			
Mounting			DIN35 rail			
Dimensions(mm) (WxHxL)		a	18	36	54	72
		b	89	89	89	89
		c	72	74	74	74
Weight	kg		0.12	0.24	0.36	0.48

■ Standard    □ Optional    — None

Appearance



- 1 Brand
- 2 Type
- 3 Rated current
- 4 Rated voltage
- 5 Conformed standard
- 6 Utilization category
- 7 Ordering code
- 8 Electrical diagram
- 9 Status indicator
- 10 Signal of certificates

Characteristic

Ex9IP are based on Ex9B platform. Appearance dimension is the same as Ex9B products

Function:

- Break and connect circuit on load
- Isolation

Status indication

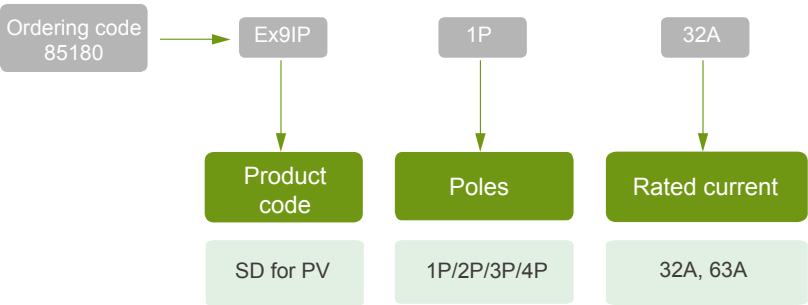
According to status of inner contact, Red/Green indication makes ON/OFF status visual.

The working voltage which topped 1000VDC can provide a more reliable protection for PV system

Conformed standard





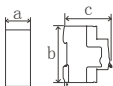
IEC/EN 60947-3

Selection Guide

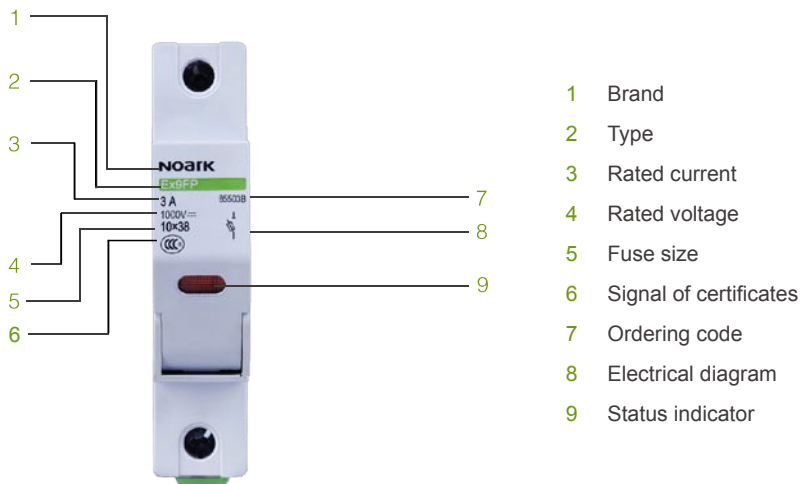




## Parameters

SD Ex9IP for PV							
For PV DC ( IEC/EN 60947-3 )							
Poles			1P	2P	3P	4P	
Electrical performance							
Rated working voltage		Ue	VDC	250	500	750	1000
Rated current		In	A	32,63			
Rated insulated voltage		Ui	V	1000			
Rated short-time withstand current		le 1s		12			
Rated short-current making capacity		le 0.1s		20			
Service life (C-O)	Mechanical	Actual value		10000			
		Standard value		1700			
	Electrical	Actual value		1000			
		Standard value		300			
Connection and Installation							
Protection degree	All sides			IP40			
	Connection terminal			IP20			
Utilization category				DC-22B			
Wire		mm		1~35			
Working temperature		℃		-30~+70			
Resistance to humidity and heat				Class 2			
Altitude above sea				≤2000			
Relative humidity				+20℃, ≤95%; +40℃, ≤50%			
Pollution degree				3			
Installation environment				Avoid obvious shock and vibration			
Installation category				Class III			
Installation class				TH35-7.5/DIN35 rail			
Appearance dimension (mm) ( WxHxL )		a		18	36	54	72
		b		89			
		c		80			
Weight		kg		0.12	0.24	0.36	0.48

Appearance



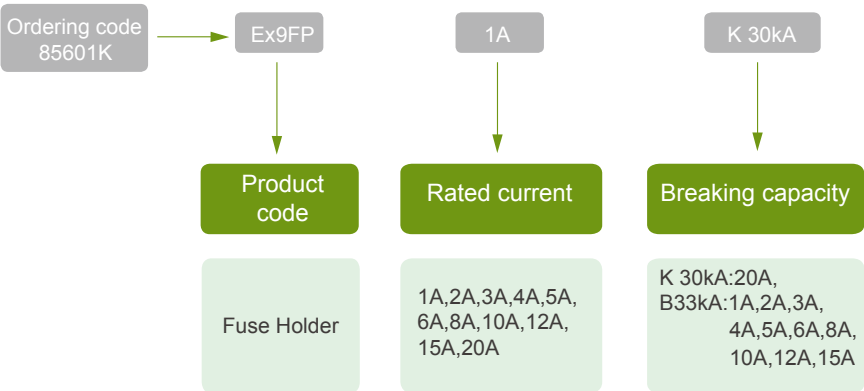
Characteristic

- The range of voltage: 1000V DC
- Maximum of breaking capacity is 33KA to provide a reliable protection
- The innovation way of fuse replacing make the operation safer
- Fault indication will be on the light constantly when a fault occur, and to remind the customer replace the fuse timely
- The size of applicable fuse: 10×38mm

Conformed standard



IEC/EN 60269

Selection Guide





## Parameter

Ex9FP Fuse Holder for PV				
For PV DC ( IEC/EN 60269)				
Poles			1P/2P	
Electrical performance				
Rated working voltage	Ue	VDC	1000	
Rated current	In	A	1,2,3,4,5,6,8,10,12 , 15	20
Breaking capacity		kA	33	30
Max power dissipation		w	3	
Connection and Installation				
Protection degree			IP20	
Wire		mm	2.5~10	
Working temperature		℃	-30~+70	
Resistance to humidity and heat			Class 2	
Altitude above sea			≤2000	
Relative humidity			+20℃, ≤95%; +40℃, ≤50%	
Pollution degree			3	
Installation environment			Avoid obvious shock and vibration	
Installation class			Class III	
Installation category			TH35-7.5/DIN35 rail	
Appearance dimension (mm) ( WxHxL )		a	18	
		b	89	
		c	80	
Fuse size		mm	10x38	
Weight		kg	0.07	

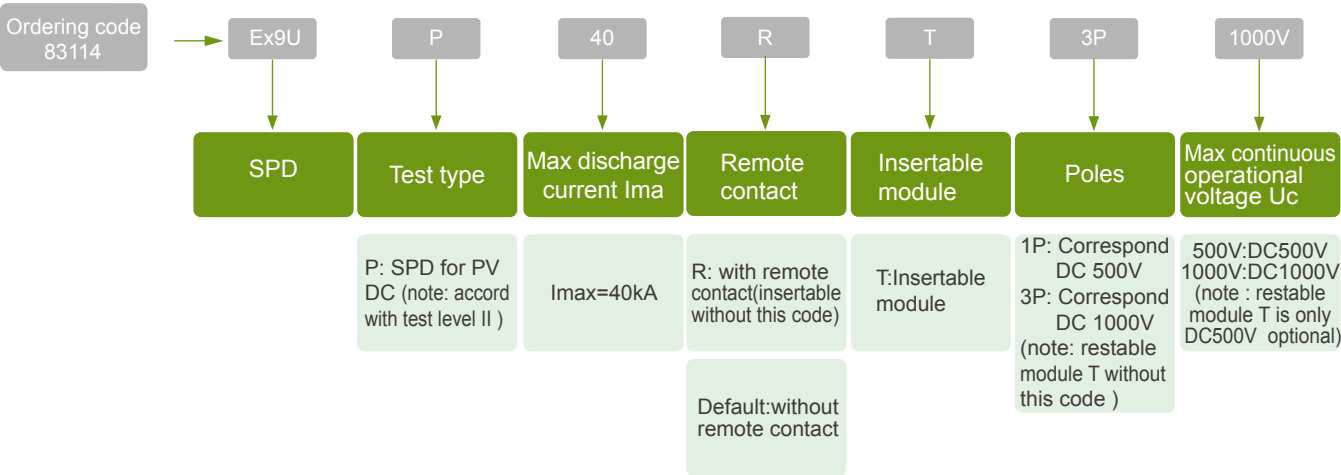


## Characteristic

### Ex9UP series surge protective device






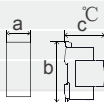
- Products are verified by Class II test, which can withstand short-time impulse current
- Products special for PV system
- The voltage of products is up to 1000VDC
- When the deterioration of varistor occurs, the heat release unit can separate the SPD from the main circuit to avoid danger of fire
- Plug-in module design, make it convenient to change module without connection
- Remote-signal port is able to provide remote indication and alarm
- Indication unit help users to know the status of device

## Selection Guide







SPD Ex9UP			Ex9UP	
For PV DC ( IEC 61643-1/ EN 61643-11)				
Poles			1P	3P
Electrical performance				
Test type			II	
Open voltage	Uoc max	V DC	500	1000
Max continuous operational voltage	Uc	V DC	500	1000
Nominal discharge current	In(8/20)us	kA	20	
Maximum discharge current	I <sub>max</sub> (8/20)us	kA	40	
Voltage protection level	Up	kV	2.0	3.8
Control and indication				
Instruction				
Insertable module				
Remote contact				
	Max working voltage (V)		250V AC / 30V DC	
Remote contact	Max working current( Resistive/ Inductive )		1A (250V AC )	
	Max working current ( Resistive/ Inductive )		1A (30V DC )	
Connection and Installation				
Wire	Hard calbe	mm <sup>2</sup>	4~25	
	Flexible calbe	mm <sup>2</sup>	4~16	
Stripping length		mm	10	
Terminal screws			M5	
Torque (Nm)	Main circuit		3.5	
	Remote contact		0.25	
Protection degree	All sides		IP40	
	Connection terminal		IP20	
Installation environment	Avoid obvious shock and vibration			
Altitude above sea	≤2000			
Working temperature	-30~+70			
Relative humidity	30%~90%			
Installation category	TH35-7.5/DIN35 rail			
Appearance dimension (mm) ( W×H×L )		a	18	54
		b	102	99
		c	67.6	67.6
		Weight	kg	0.12

## Product Overview



### PVBx Series Photovoltaic Combiner Box

PVBx series PV combiner box functions of combining circuit and surge protection between PV modules and inverters.

### PVBx Z Series Smart Photovoltaic Combiner Box

PVBx Z series intelligent PV combiner box could upload and monitor the status of current, voltage, switch and SPD. Electrical data is displayed by LED and transferred by the means of RS485

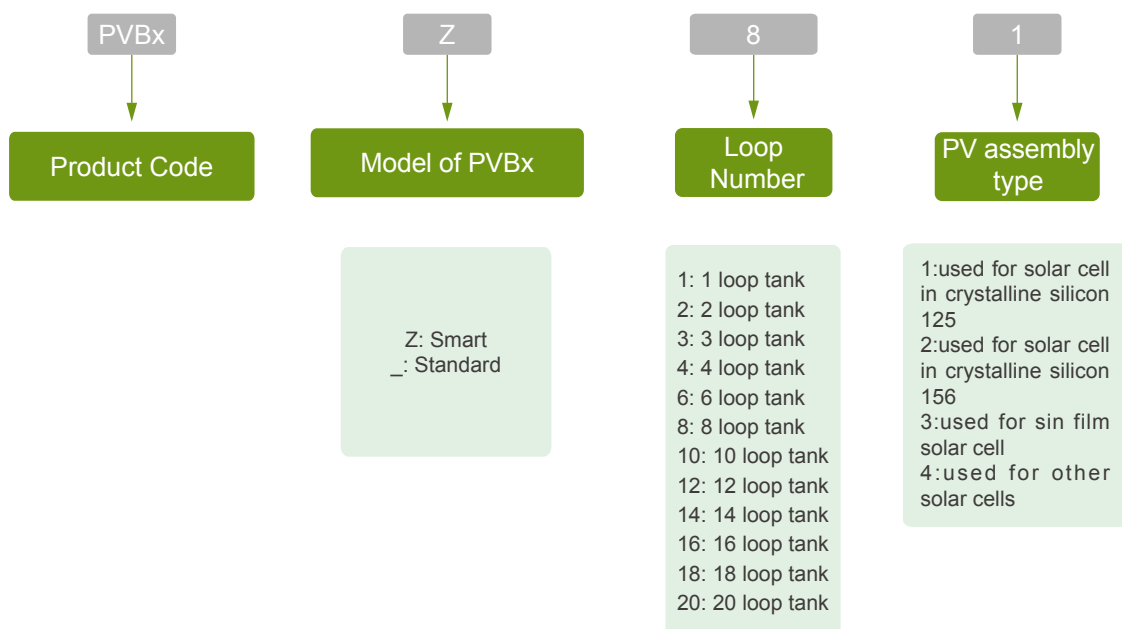
## Advantages

ALL components are PV specialized by Noark, voltage of which is up to 1000VDC

Different size of combiner box and different solution to meet different demands of customers.  
Number of mounting units are from 1 to 20.

Protection degree of IP 65

## Selection





## Parameter

Model	Standard	Smart
<b>Electrical performance</b>		
Voltage range of PV array(V DC)		1000
Max.string input in parallel		20
Max.current of each fuse input(A)		15
Max diameter of each input cable(mm)		6.5
Max diameter of each output cable(mm)		17
<b>Protection function</b>		
Input fuse/breaker for PV DC		■
Output breaker for PV DC		■
Lightning protection module for PV		■
preventing reverse current		□
<b>Environmental Adaptability</b>		
Protection degree		IP65
Relative humidity		0~99%
Installation temperature		-25~+70
Anti-corrosion		corrosin of rain,hail and snow
Temperature resistance(Box)		-40(oc)to +120(oc)
Position-free materials		exclusive of silicon and halogen
Flame retardant		conform to IEC 60695-2-11,UL Subject 94V-2
Chemical resistance		Prevent 10% of acid,alkali,gasoline and heavy oil
UV resistance		UV resistance tested for outdoor installation
Degree of resistance to impact		Degree of resistance to impact IK08(5 Joule)
<b>Smart communication</b>		
Communication interface	—	RS485
Each circuit current measurement	—	■
Voltage measurement system	—	■
Switch state upload	—	□
Surge protector state upload	—	□
Temperature measurement inside box	—	□
Alarm	—	□

■ Standard □ Optional — None

Monitoring string current and voltage, providing the Modbus RTU output, making combiner box "smart".

- Standardized products, 4~20strings, the same dimensions of all products
- Double-layer wiring, large aperture thread design
- Easy installation, simple operation
- High accuracy:  $\pm 1\%RDG + 2DGT$
- Low-power consumption
- Relay signal output function
- With power-supply module PVP, the monitoring device SUP could be supplied by PV power instead of grid

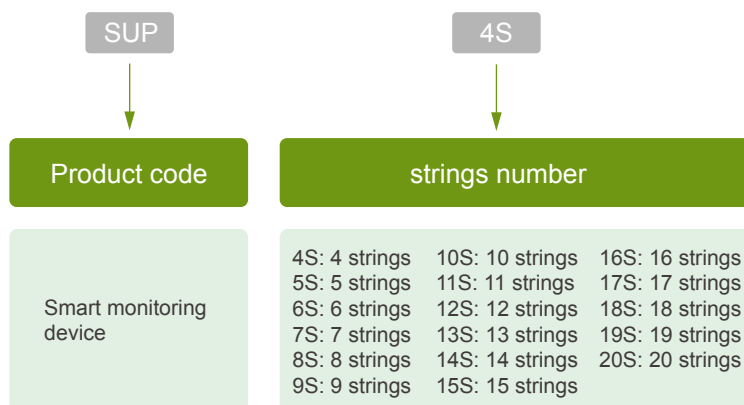


SUP

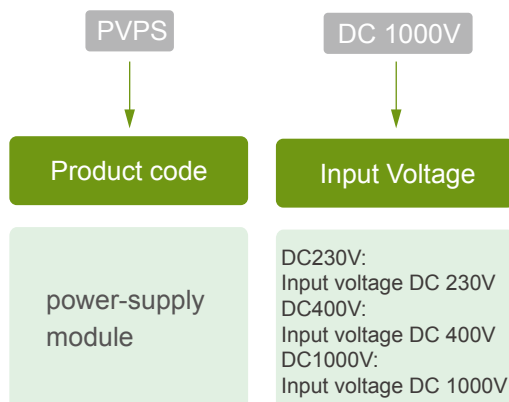


Power-supply module

#### Selection of monitoring device



#### Selection of power-supply module





Electrical Specification for Monitoring device		ELECTRICAL SPECIFICATION	
Power			
Input Power		24VDC, 350mA, Required (not included)	
Max. Power Consumption (W)		8(Input Voltage 24VDC, 20 Channels)	
Monitoring			
Max. Quantity of Channels		20	
Maxi. String Current (A)		20	
Range of Current Monitoring (A)		0.5~18 per channel	
Accuracy of Current Monitoring		$\pm(1\%RDG+2DGT)$	
Range of Voltage Monitoring (V)		100~1200	
Accuracy of Voltage Monitoring		$\pm(1\%RDG+3DGT)$	
Output			
Alarm		Over Voltage200V~1200V(Adjustable)	
		Under Voltage50V~800V(Adjustable)	
		Over load protection1.0A~18.0A(Adjustable), default13.6A	
		Reverse Current-18.0A~-1.0A(Adjustable)	
Status Monitoring		SPD	
		Fuse	
		Breaker	
Communication			
Protocols		ModBus-RTU	
Baud rate		4800bps/9600bps/19200bps(Adjustable), default value 9600bps	
Addressing		1~247	
Communication Distance 1200		1200m(shielded twisted-pair cable)	
Environment			
Operation Temperature (°C)		-25~+70	
Humidity (%)		0~95	
Storage Temperature (°C)		0~+85	
Altitude (m)		≤2500	
Pollution Degree		2	
Physical			
Size		10.25"×3.2"×2.8" (260mm×80mm×70mm)	
Weight (kg)		0.575(Full Function, 20 Channels)	

Electrical Specification for Power-supply module		ELECTRICAL SPECIFICATION			NOTES
Maximum ratings		Min.	Typ.	Max.	
Input Voltage (Vdc)		-0.3		1200	
Operating Temperature (°C)		-25		70	
Storage Temperature (°C)		-40		85	
Output Current (mA)				350	
Input Characteristics					
Operating Input Voltage (Vdc)		100		1000	
Maximum Input Current (mA)				120	Vout=24V, Full load
Output Characteristics					
Output Voltage Set Point (%Vset)		-3		+3	With a 1.0% trim resistor
Output Voltage Regulation (%Vset)	Over Line	-1		+1	Vin=100~1000Vdc
	Over Load	-2		+2	Io=Min to Full Load
	Over Temperature	-2		+2	Ta=-25°C to 70°C
	Total output range	-2		+2	Over load, line, temperature regulation
Output Voltage Ripple and Noise(mV) (5Hz~20MHz bandwidth)	Peak-to-Peak			500	Full Load
	RMS			100	Full Load
Output Voltage Over-shoot at Start-up (%Vset)				5	Vin=400V, Turn on
Output Voltage Under-shoot at Power-Off (mV)				100	Vin=400V, Turn OFF
Efficiency (%)			75		Vin=400V, Vout=24V, Full load
Physical					
Size (mm)		4.72"×1.8"×3.23" (120×46×82)			
Weight (kg)			0.24		

## Inverters



Inverter is one of the most important component in photovoltaic system. This device is comprised of inverter bridge unit, logic control unit, filter unit, protection unit of AC and DC unit. It is used to convert direct current (DC) to alternating current (AC).

It is regulated by IEC 60364-7-712 that "isolation should be added to both sides of AC and DC when maintaining inverter unit of PV system". Besides, Ex9MD DC MCCBs offer protection function for both DC and AC, the whole range of low voltage products are fully complying with Standard IEC 60947-1, especially on the requirements for isolation. Therefore, NOARK Electrics provide protection and isolation of shortload for inverter from 1 to 500KW.

### Low voltage products in Inverters system

- Moulded Case Circuit Breakers—Ex9MD1(750/1000V DC)  
Ex9MD2(750/1000V DC)  
Ex9MD3(750/1000V DC)  
Ex9MD4(750/1000V DC)  
Ex9MD5(750/1000V DC)
- Rotary handle—RHD
- Miniature Circuit Breakers—Ex9BP(750/1000V DC )
- Surge Protection Device—Ex9UP(750/1000V DC)



Ex9MD



RHD

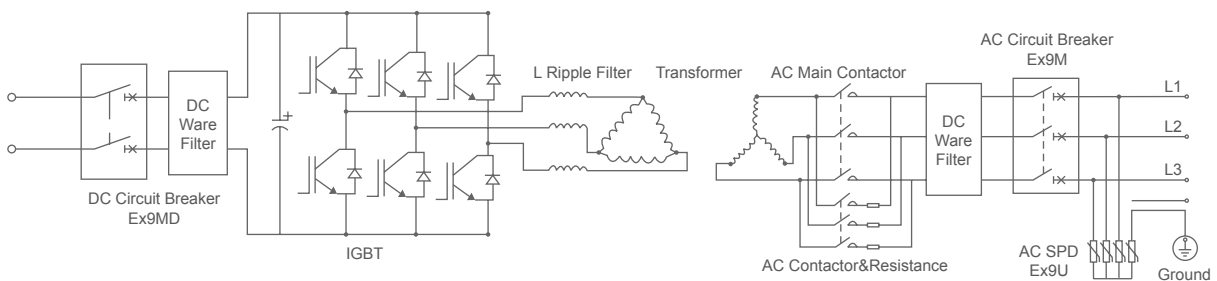


Ex9BP



Ex9UP

### Diagram





## Switchboard for DC protection and isolation



This switchboard has both input and output interface for direct current. The main purpose of positioning this device between String Combiner Box and Inverter system or other DC charging equipment is to exemplify the direct current out of String Combiner Box in a large PV system with multiple PV arrays. NOARK Electrics can supply relative DC circuit breakers, surge protection devices and other low voltage products for switchboard from 10kw to 500kw.

### Low voltage products in DC switchboard

- Moulded Case Circuit Breakers—Ex9MD1(750/1000V DC)  
Ex9MD2(750/1000V DC)  
Ex9MD3(750/1000V DC)  
Ex9MD4(750/1000V DC)  
Ex9MD5(750/1000V DC)
- Miniature Circuit Breakers—Ex9BP(250/500/750/1000V DC)
- Surge Protection Device—Ex9UP(500/1000V DC)



Ex9MD

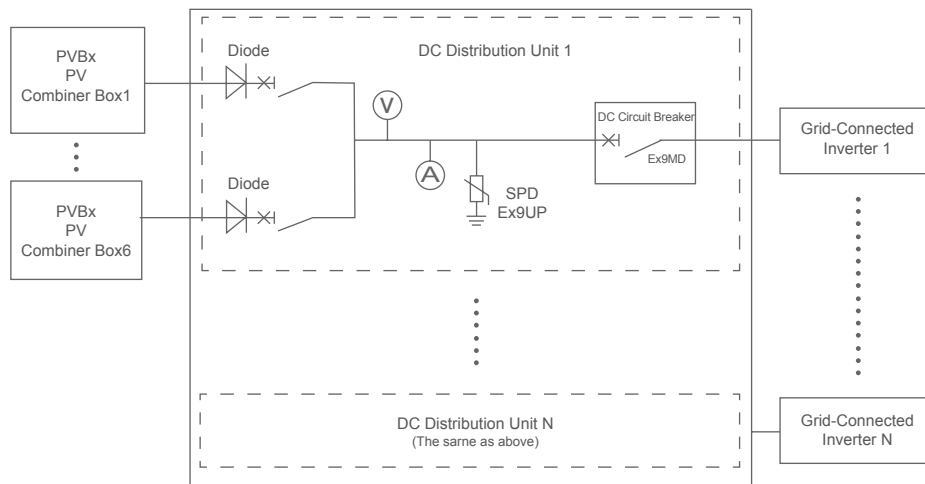


Ex9BP



Ex9UP

### Diagram





## Switchboard for AC protection and isolation



In contrast of using AC circuit breaker in off-grid system to distribute electricity, AC switchboard offers the interface with power grid for inverters. On the upstream and downstream of power grid or generators, there are basically circuit breakers, PV surge protection device, and meters (RS485) right after inverters. On top of them, AC grid has current and voltage meters for concise measurement and easy system management. NOARK Electrics is able to supply all required components in AC switchboard.

### Low voltage products in AC switchboard

- Air Circuit Breaker——Ex9A(690V AC)
- Moulded Case Circuit Breakers——Ex9M(690V AC)
- Moulded Case Circuit Breakers——Ex9B(400V AC)
- Surge Protection Device——Ex9U(275~440V AC)



Ex9A



Ex9M

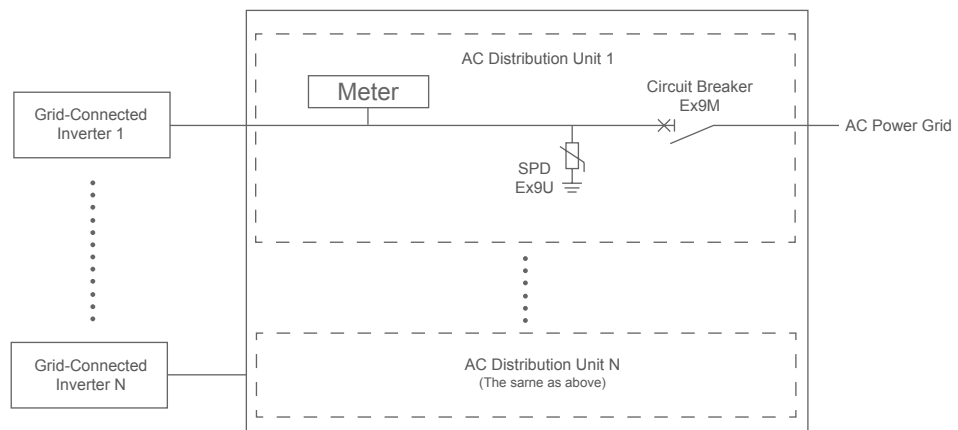


Ex9B



Ex9U

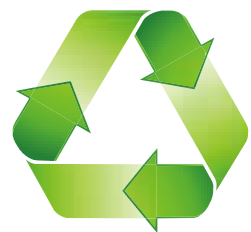
### Diagram





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