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## 800 V AC Fusegear

Fusegear for string inverter protection



- Enhanced performance
- Convenience and ease
- Safety and protection



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**ABB's fusegear with improved performance is ready for the trend towards higher voltages up to 1000 V AC in photovoltaic installations.**

**InLine II, EasyLine XLP and SlimLine XRG offer high performance, safety, convenience and ease for AC combiners and switchboards.**



# Table of contents

<b>01. Overview - Fusegear for inverter protection</b>	4
<b>02. Technical data</b>	10
<b>03. Order information</b>	13



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# Fusegear for string inverter protection

## 1000 V AC photovoltaic installations

The use of string inverters for large photovoltaic systems with 20 MW or less of installed power is set to increase. Operating at higher voltages reduces the transmission losses and cabling costs of these plants, while limiting the impact of any faults, reducing downtime and maximizing productivity.

Higher voltage ratings are often combined with multi MPPT string inverters that require fewer DC combiner boxes and less wiring complexity. Those inverters are smaller, lighter and easier to handle, making installations and replacements manageable with less staff.

Higher voltage also helps photovoltaic plants to increase the power density inside inverters. This brings benefits like easier logistics, installation times are shorter and wiring costs are lower, leading to significant overall savings of up to 20 percent.

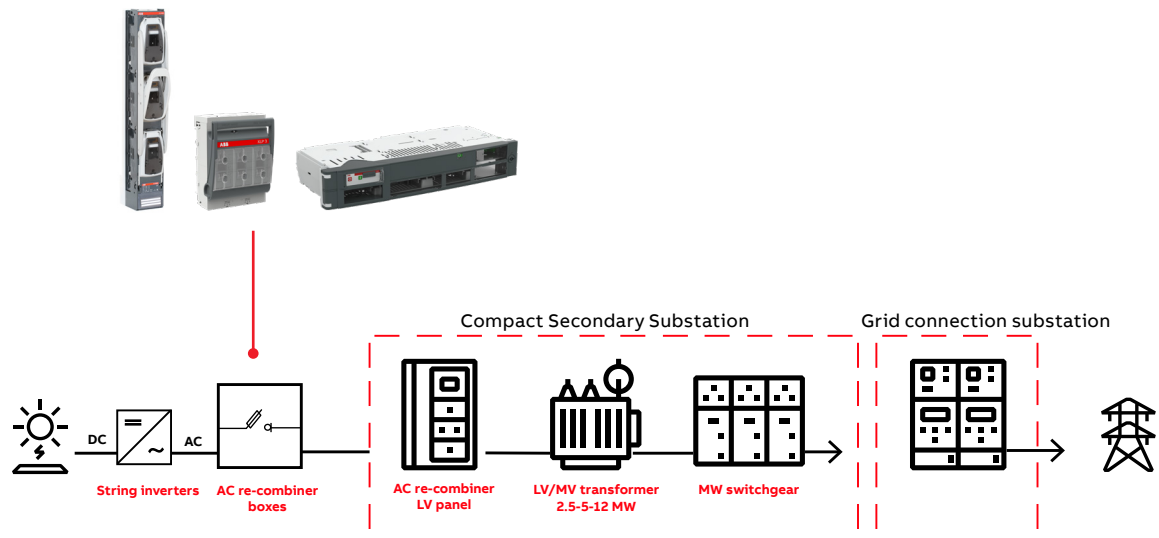
ABB's fusegear with improved performance is ready for the future trend towards higher voltages, up to 1000 V AC and reduces power losses between the inverter at the low voltage side and medium voltage side. InLine II, EasyLine XLP and SlimLine XRG are compact and easy to install solutions for AC combiners and switchboards.



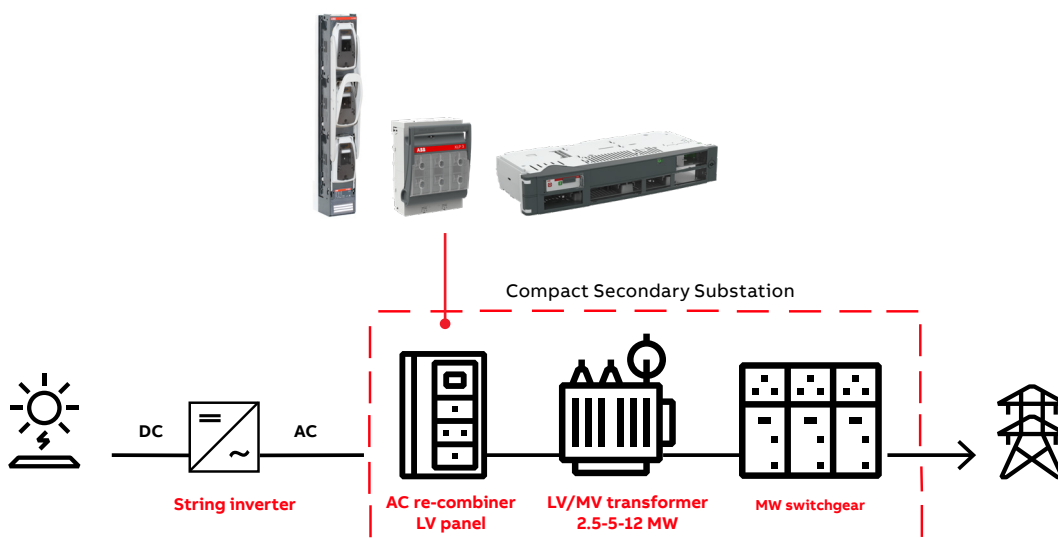


# Fusegear for string inverter protection

## Application examples



01 Example of a photovoltaic installation, where fusegear could be used as protection device in AC combiners



02 Inverter connected to protective devices (fusegear) inside the Compact Secondary Substation (CSS)

# Fusegear for string inverter protection

## Ready for current and future requirements

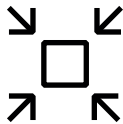
ABB fusegear is ready to meet current and future requirements for safe and reliable switching and protection in photovoltaic installations.



### High performance

- 800/1000 V AC rated
- AC-22B utilization categories with a rated operational current of up to 630 A
- Short circuit protection up to 120 kA

**800/1000 V AC**  
ratings, utilization  
category AC-22B



### Convenience and ease

- Solutions for 50 mm, 60 mm, 100 mm and 185 mm busbar distance available
- Wide variety of cable terminals enables a flexible installation

**Short circuit  
capacity up to  
120 kA**



### Safety and protection

- Two versions available: essential and enhanced safety with EFM
- Electronic Fuse Monitoring (EFM) functionality available up to 800 V AC
- High degree of protection from the front, starting from IP30 in closed position

**Electronic Fuse  
Monitoring  
available up to  
800 V AC**







# Fusegear for string inverter protection

## Product overview



### InLine II fuse switch-disconnectors

- Suitable in AC combiner boxes, typically used in non-segregated panels
- Allows reduced dimension installations especially in vertical installations
- Rated operational current up to 1000 V AC
- AC-22B utilization category, with a rated operational current of up to 630 A
- Short circuit protection up to 120 kA
- Available in essential configuration and enhanced configuration with factory mounted Electronic Fuse Monitoring



### EasyLine XLP fuse switch-disconnectors

- Suitable for power distribution panels and in AC combiner boxes, typically used in segregated panels
- Mounted in horizontal position, allows to realize easy segregation
- Rated up to operational current up to 1000 V AC
- AC-22B utilization categories with a rated operational current of up to 400 A
- Short circuit protection up to 120 kA
- Available in essential configuration and enhanced configuration, with EFM accessories or factory mounted EFM



### SlimLine XRG switch-disconnector fuses

- Suitable for AC combiner boxes and switchboards
- Integrated motor operation unit allows remote operation
- Rated up to operational current up to 800 V AC
- AC-22B utilization categories with a rated operational current of up to 250 A
- Short circuit protection up to 100 kA
- Available in essential configuration and enhanced configuration with factory mounted Electronic Fuse Monitoring



### OFAZ-HV fuse bases

- The OFAZ-HV plastic fuse bases fulfill the highest requirements with a total safety concept and now are available with  $U_i$  and  $U_e$  1000 V AC/DC
- Meet market requirements, no added niche features
- Simple, reliable and functional



# Enhanced configurations

## Electronic Fuse Monitoring (EFM)

ABB Fusegear products with enhanced configuration include EFM functionality for additional safety, serviceability and continuous operation.



**Receive alarm and locate fault quickly**



**Ease serviceability**



**Minimize downtime**

The Electronic Fuse Monitor (EFM) gives a remote alarm at any fault conditions if a fuse is blown and allows faults to be located quickly.

The EFM increases the ease of serviceability, minimizes downtime and provides additional safety.

The EFM unit is self supplied, which means no additional power supply is required.

The EFM functionality is available up to 800 V AC. The fuse status is also visible on the product, with red and green LEDs.



SlimLine XRG switch-disconnectors, enhanced configuration with EFM



InLine II fuse switch-disconnectors, enhanced configuration with EFM

More information is available in the product catalogues:



**SlimLine XRG  
Product catalogue**



**EasyLine XLP  
Product catalogue**



**InLine II  
Product catalogue**



EasyLine XLP fuse switch-disconnectors, enhanced configuration with EFM

## Technical data

InLine II, EasyLine XLP, SlimLine XRG

	InLine II						EasyLine						SlimLine	
	ZLBM 00-100	ZLBM 00/ZHBM 00	ZLBM/ZHBM 1		ZLBM/ZHBM 2		ZLBM/ZHBM 3		XLP00	XLP1		XLP2	XRG1	
NH fuse link size acc. to IEC60269-2	00	00	1		1/2		3		00		1		2	1
Tested Fuse type	gS	aR	gS	aR	gS	aR	gS	aR	gG	aR	gG	gS	gS	gS
Rated operational voltage U <sub>e</sub> . (V AC)	800	1000	800	1000	800	1000	800	1000	800	1000	800	800	800	800
Rated operational current I <sub>e</sub> . (A)	125	125	200	250	400	400	400	630	63	125	160	250	400	250
Rated insulation voltage U <sub>i</sub> . (V AC)	1000	1000	1000		1000		1000		1000		1000		1000	1000
Rated impulse withstand voltage U <sub>imp</sub> . (kV)	8	8	8		8		8		8		8		8	8
Fuse protected short circuit withstand current (kArms)	120	120	100	120	100	120	100	120	50	120	50	120	120	100
Fuse protected short circuit making (kArms)	120	120	100	120	100	120	100	120	50	120	50	120	120	100
Rated making breaking capacity	800 V AC	AC-22B	-		AC-22B		AC-22B		AC-22B		AC-22B		AC-22B	AC-22B
	1000 V AC	-	AC-22B		AC-22B		AC-22B		AC-22B		AC-22B		-	-
Rated frequency (HZ)	50/60	50/60	50/60		50/60		50/60		50/60		50/60		50/60	50/60
Total power loss at I <sub>th</sub> (W)	33,4	30,8/33,6	36,2/37,8		52,2/55,5		91,3/97,2		3,5		7,5		13	70
Degree of protection from the front acc. to IEC / EN 60529	Open	IP20	IP20		IP20		IP20		IP20		IP20		IP20	-
	Closed	IP30	IP30		IP30		IP30		IP30		IP30		IP30	IP41
Electrical durability, operating cycles	200	200	200		200		200		200		200		200	200
Mechanical durability, operating cycles	1400	1400	1400		800		800		1400		1400		800	1400

Type tested according to EN/IEC 60947-3, for more information please refer to the product catalogues.



## Technical data

### OFAZ-HV fuse bases

		OFAZ00_-HV	OFAZ1_-HV	OFAZ2_-HV	OFAZ3_-HV
For NH fuse links acc. to IEC60269-2		00/000	0/1	1/2	2/3
Rated operational voltage Ue.*	(V AC/V DC)	1000	1000	1000	1000
Rated operational current Ie.	(A)	160	250	400	630
Rated insulation voltage Ui.*	(V AC/V DC)	1000	1000	1000	1000
Conv. free air thermal current with fuse links Ith	(A)	160	250	400	630
Conv. free air thermal current with solid links Ith	(A)	200	320	500	800
Rated frequency	(Hz)	50/60	50/60	50/60	50/60
Max. permis. power dissipation per fuse link Pa	(W)	12	32	45	60
Current derating factors for max. temperature <sup>1)</sup>					
	35 °C	1	1	1	1
	40 °C	0,95	0,95	0,95	0,95
	50 °C	0,85	0,85	0,85	0,85
Ambient temperature range T amb	(°C)	-25 ...+55	-25 ...+55	-25 ...+55	-25 ...+55
Rated operating mode		Uninterrupted	Uninterrupted	Uninterrupted	Uninterrupted
Mounting position		Vertical, horizontal	Vertical, horizontal	Vertical, horizontal	Vertical, horizontal
Pollution degree		3	3	3	3
Overvoltage category		III	III	III	III
Degree of protection		IP00 without covers, IP20 with covers	IP00 without covers, IP20 with covers	IP00 without covers, IP20 with covers	IP00 without covers, IP20 with covers
Standards		IEC60269-2, DIN VDE 0636, DIN 43620	IEC60269-2, DIN VDE 0636, DIN 43620	IEC60269-2, DIN VDE 0636, DIN 43620	IEC60269-2, DIN VDE 0636, DIN 43620

<sup>1)</sup> OFAZ\_ and OFAX4\_ types fuse bases derating needed as follows, please contact us for further information.

\* According to IEC 60269-2 the designation of voltage by standard is AC and DC.

More information is available in the product catalogue:



OFAZ Fuse bases  
Product catalogue







## Order information

### InLine II

#### Essential configuration

Type	Order number	NH fuse size	Ith/Ie @ 800 V AC-22B [A]	Ith/Ie @ 1000 V AC-22B [A]	Ip @ 800 V [kA]	Ip @ 1000 V [kA]
ZLBM00-3P-M8	1SEP620010R3000	00	-	125	-	120
ZLBM00-3P-V	1SEP620010R3020	00	-	125	-	120
ZLBM00-100-3P-M8	1SEP620150R3000	00	125	-	120	-
ZLBM1-3P-M12	1SEP620011R3000	1	200	250	100	120
ZLBM1-3P-V	1SEP620011R3020	1	200	250	100	120
ZLBM2-3P-M12	1SEP620012R3000	1/2	400	400	100	120
ZLBM2-3P-V	1SEP620012R3020	1/2	400	400	100	120
ZLBM3-3P-M12	1SEP620013R3000	2*/3	400	630	100	120
ZLBM3-3P-V	1SEP620013R3020	2*/3	400	630	100	120
ZHBM1-3P-M12	1SEP620021R3000	1	250	250	100	120
ZHBM1-3P-V	1SEP620021R3020	1	250	250	100	120
ZHBM2-3P-M12	1SEP620022R3000	1/2	400	400	100	120
ZHBM2-3P-V	1SEP620022R3020	1/2	400	400	100	120
ZHBM3-3P-M12	1SEP620023R3000	2*/3	400	630	100	120
ZHBM3-3P-V	1SEP620023R3020	2*/3	400	630	100	120



\* With dedicated adapter only 1SEP621288R0001 - ZLBM3 NH2 fuse adapter.

#### Enhanced configuration – with factory mounted Electronic Fuse Monitor (EFM)

Type	Order number	NH fuse size	Ith/Ie @ 800 V AC-22B [A]	Ip @ 800 V [kA]
ZLBM1-3P-M12-EFM	1SEP620011R3001	1	250	120
ZLBM1-3P-V-EFM	1SEP620011R3021	1	250	120
ZLBM2-3P-M12-EFM	1SEP620012R3001	1/2	400	120
ZLBM2-3P-V-EFM	1SEP620012R3021	1/2	400	120
ZLBM3-3P-M12-EFM	1SEP620013R3001	2*/3	400	120
ZLBM3-3P-V-EFM	1SEP620013R3021	2*/3	400	120
ZHBM1-3P-M12-EFM	1SEP620021R3001	1	250	120
ZHBM1-3P-V-EFM	1SEP620021R3021	1	250	120
ZHBM2-3P-M12-EFM	1SEP620022R3001	1/2	400	120
ZHBM3-3P-M12-EFM	1SEP620023R3001	2*/3	400	120
ZHBM2-3P-V-EFM	1SEP620022R3021	1/2	400	120



\* With dedicated adapter only 1SEP621288R0001 - ZLBM3 NH2 fuse adapter.



## Order information

### InLine II accessories

#### Auxiliary contacts

	Type	Order number	Description
	ZLBM00-100 Auxiliary switch NO/ NC	1SEP621097R0001	Normally closed/normally open
	ZLBM Auxiliary switch NC	1SEP619554R0001	Normally closed, ZLBM/ZHBM 00: 1 Aux. Switch per phase. ZLBM/ZHBM 123: 2 Aux. Switches per phase
	ZLBM Auxiliary switch NO	1SEP619555R0001	Normally open, ZLBM/ZHBM 00: 1 Aux. Switch per phase. ZLBM/ZHBM 123: 2 Aux. Switches per phase

#### Cable shrouds

	Type	Order number	Description
	ZLBM00 Cable shroud L86	1SEP619690R0001	Cable shroud with total length 86 mm
	ZLBM00 Cable shroud L177	1SEP619207R0001	Cable shroud with total length 177 mm
	ZLBM123 Cable shroud L86	1SEP619211R0001	Cable shroud with total length of 86 mm, for single switch
	ZLBM123 Cable shroud L177	1SEP619210R0001	Cable shroud with total length of 77 mm, for single switch

More information is available in the product catalogue:



**InLine II**  
Product catalogue

## Order information

### EasyLine XLP

#### Essential configuration

Type	Order number	NH fuse size	I <sub>th</sub> /I <sub>e</sub> @ 800V AC-22B [A]	I <sub>th</sub> /I <sub>e</sub> @ 1000V AC-22B [A]	I <sub>p</sub> @ 800V [kA]	I <sub>p</sub> @1000V [kA]
XLP00	1SEP101890R0001	00	63	125	50	120
XLP00-6BC	1SEP101890R0002	00	63	125	50	120
XLP00-6M8	1SEP101890R0004	00	63	125	50	120
XLP00-A60/60-B-3BC-below	1SEP101916R0002	00	63	125	50	120
XLP00-A60/60-A-3BC-above	1SEP101917R0001	00	63	125	50	120
XLP1-A60/85-B-3BC-below	1SEP101918R0001	1	250	-	120	-
XLP1-A60/85-A-3BC-above	1SEP101919R0001	1	250	-	120	-
XLP1	1SEP101891R0001	1	250	-	120	-
XLP1-6BC	1SEP101891R0002	1	250	-	120	-
XLP1-6M10	1SEP101891R0004	1	250	-	120	-
XLP1-A60/85-B-3BC-below	1SEP101918R0001	1	250	-	120	-
XLP1-A60/85-A-3BC-above	1SEP101919R0001	1	250	-	120	-
XLP2	1SEP101892R0001	2	400	-	120	-
XLP2-6BC	1SEP101892R0002	2	400	-	120	-
XLP2-A60/120-A-above	1SEP102285R0001	2	400	-	120	-
XLP2-A60/120-B-below	1SEP102286R0001	2	400	-	120	-



#### Enhanced configuration – with factory mounted Electronic Fuse Monitor (EFM)

Type	Order number	NH fuse size	I <sub>th</sub> /I <sub>e</sub> @ 800V AC-22B [A]	I <sub>p</sub> @ 800 V [kA]
XLP00-EFM-6BC	1SEP101890R0012	00	63	50
XLP1-EFM-6BC	1SEP101891R0012	1	250	120
XLP2-EFM-6BC	1SEP101892R0012	2	400	120



## Order information

### EasyLine XLP accessories


#### Auxiliary contacts

	Type	Order number	Description
	MS-XLP00123	1SEP407742R0001	Micro auxiliary switch (not for XLP000)
	AUX-NC-XLP00123	1SEP407742R0002	Auxiliary switch NC (Red)


#### Cable shrouds

	Type	Order number	Description
	CS-XLP1-3P	1SEP407793R0002	XLP1 Cable shroud
	CS-XLP00-3P	1SEP407793R0001	XLP00 Cable shroud

#### Padlock device

	Type	Order number	Description
	PLD-XLP00123	1SEP407786R0001	Access padlock device for all XLP sizes

#### Front cover with Electronic Fuse Monitoring (EFM)

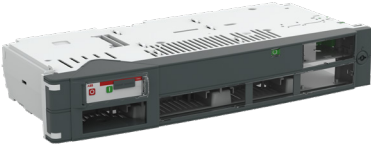
	Type	Order number	Description
	FC-XLP00-3P-EFM	1SEP101873R0007	XLP00 Front cover with EFM (Electronic Fuse Monitoring)
	FC-XLP1-3P-EFM	1SEP101883R0007	XLP1 Front cover with EFM (Electronic Fuse Monitoring)




## Order information

### SlimLine XRG

#### Essential configuration

	Type	Order number	NH fuse size	Ith/Ie @ 800 V AC-22B [A]	Ip @ 800 V [kA]
	XRG1-50/5-3P	1SEP204481R1500	1	250	100
	XRG1-50/5-3P-MOT	1SEP204481R1502	1	250	100
	XRG1-185/10-3P	1SEP204481R3500	1	250	100
	XRG1-185/10-3P-MOT	1SEP204481R3502	1	250	100

#### Enhanced configuration - with factory mounted Electronic Fuse Monitor (EFM)

	Type	Order number	NH fuse size @800V	Ith/Ie AC-22B [A]	Ip @ 800 V [kA]
	XRG1-50/5-3P-EFM	1SEP204481R1501	1	250	100
	XRG1-50/5-3P-MOT-EFM	1SEP204481R1502	1	250	100
	XRG1-185/10-3P-EFM	1SEP204481R3501	1	250	100
	XRG1-185/10-3P-MOT-EFM	1SEP204481R3503	1	250	100

#### Accessories - auxiliary contacts for SlimLine XRG

	Type	Order number	Description
	NO-XR1-KIT	1SEP619084R0001	Aux. switch 1NO kit, with wires and connector
	NC-XR1-KIT	1SEP619089R0001	Aux. switch 1NC kit, with wires and connector
	NO-XR00/1-W	1SEP619094R0001	Additional auxiliary switches include 1 auxiliary switch and 2 wires
	NC-XR00/1-W	1SEP619095R0001	Additional auxiliary switches include 1 auxiliary switch and 2 wires

## Order information

### OFAZ-HV fuse bases



Type	Order number	NH fuse size	Rated current [A]
OFAZ1S2-HV	1SCA161628R1001	0/1	250
OFAZ1S3-HV	1SCA161629R1001	0/1	250
OFAZ2P1-HV	1SCA161630R1001	1/2	400
OFAZ2P3-HV	1SCA161631R1001	1/2	400
OFAZ2S1-HV	1SCA161632R1001	1/2	400
OFAZ3A3-HV	1SCA161636R1001	2/3	630
OFAZ2S2-HV	1SCA161633R1001	1/2	400
OFAZ00P3L-HV	1SCA161616R1001	00/000	160
OFAZ2S3-HV	1SCA161634R1001	1/2	400
OFAZ1P1-HV	1SCA161625R1001	0/1	250
OFAZ1P3-HV	1SCA161626R1001	0/1	250
OFAZ3S1-HV	1SCA161661R1001	2/3	630
OFAZ3S2-HV	1SCA161662R1001	2/3	630
OFAZ00P1L-HV	1SCA161614R1001	00/000	160
OFAZ3P3-HV	1SCA161660R1001	2/3	630
OFAZ00S1L-HV	1SCA161618R1001	00/000	160
OFAZ00S3L-HV	1SCA161622R1001	00/000	160
OFAZ3P1-HV	1SCA161659R1001	2/3	630
OFAZ3A1-HV	1SCA161635R1001	2/3	630
OFAZ3S3-HV	1SCA161663R1001	2/3	630
OFAZ1S1-HV	1SCA161627R1001	0/1	250
OFAZ00S2L-HV	1SCA161620R1001	00/000	160



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**ABB Electrification**

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**800 V AC Fusegear**