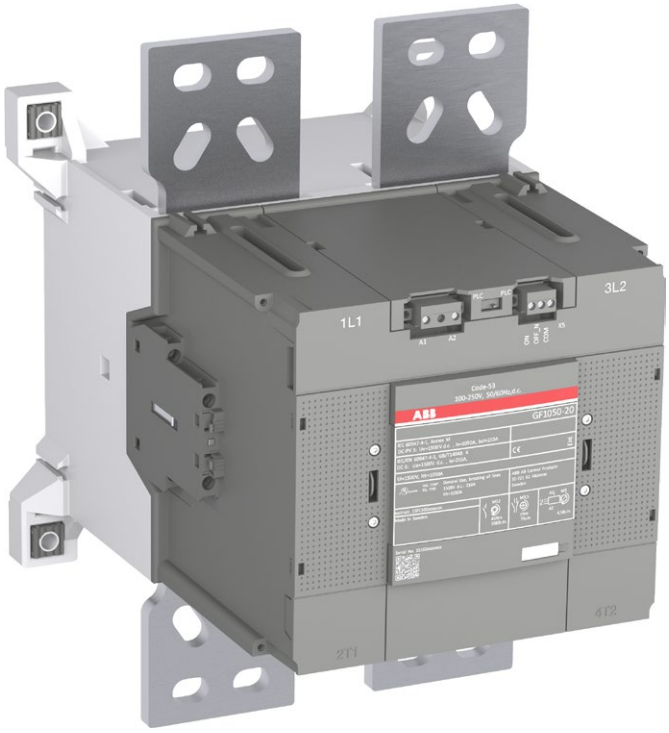
GF contactors for DC switching

The new compact and efficient way to switch 1500 V DC for PV solar power plants

GF contactors for DC switching

The compact and efficient way of DC switching



The renewable energy industry is continuously striving towards increasing its efficiency in order to compete with traditional power sources. Photovoltaic (PV) solar power is one of the sources leading the way. In moving from 1000V DC to 1500 V DC, costs of utility-scale power plants are greatly reduced.

The GF range of contactors expands ABB's current AF and GAF PV solar product offering by adding contactor switching capabilities for 1500 V DC.

Energy Efficiency

GF contactors offer tailored solutions to enable remote, automatic and energy efficient switching of 1500 V DC circuits in central PV inverter optimization. The GF contactors are built with ABB's standard low energy electronic coils for safe and controlled operation.

Continuous operation

The GF contactor features AF technology with continuous voltage and current control during the contactors operation. This ensures distinct, safe and energy efficient operations even in unstable networks. Voltage sags, dips or surges pose no threat. The GF contactor secures application uptime.

Speed up your projects

ABB's GF contactor complies with all major international standards. It features AC/DC controlled wide voltage range coils together with easily accessible coil terminals to make easier and quicker product selection and installation.

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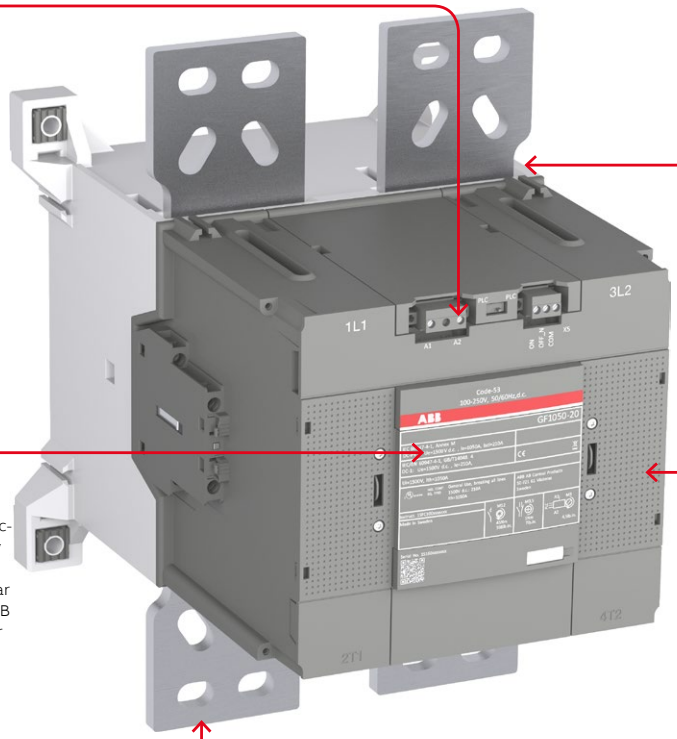
GF contactor range

The compact and efficient way of DC switching

Easy installation

GF contactors are designed for easy installation. Coil terminals and PLC control terminals are easily identified and accessed from the front of the contactor.



AF technology

GF contactors feature AF technology that ensures controlled, distinct and energy efficient operation of the contactor. Only two coils to cover 24 V AC / 20 V DC ... 60 V AC / DC and 100 ... 250 V AC / DC.

New IEC rating

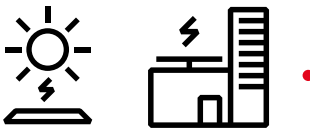
DC-PV3 and DC-PV4 are two new contactor utilization categories introduced by IEC in 2018.
Both are specifically tailored for PV solar applications. As a technical pioneer, ABB offers the GF contactor as the first ever DC-PV3 rated contactor.

Bidirectional design

The GF's two pole bidirectional design allows it to break both plus and minus, through the entire current range. Each pole is rated for 750 V DC.

Up to 1050 A 1500 V DC-PV3

The new GF range of DC contactors extends up to 1050 A for DC-PV3.

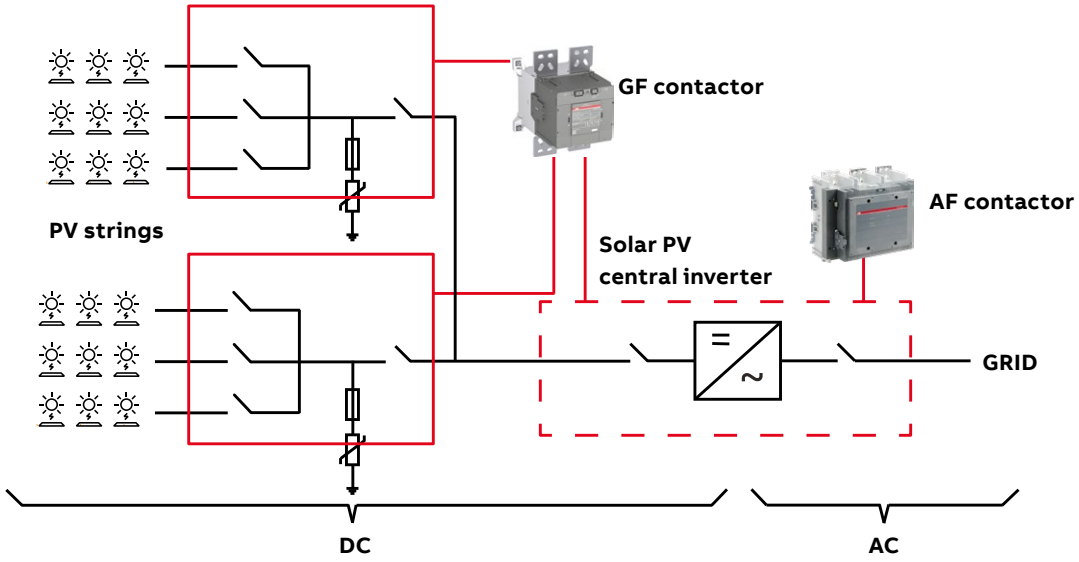


Switching DC in PV Plants

Contactors are typically selected for applications that need automatic remote control and switching. In a central PV inverter it can be necessary to switch the DC side in order to disconnect PV strings for output optimization. Grid codes sometime require a central PV inverter to be used for grid stabilization at night, this requires all PV panels to be disconnected on the DC side.

GF contactors allow remote and energy efficient switching in DC applications.
By bringing contactor switching capabilities to 1500 V DC there are now additional options for PV inverter manufacturers to solve DC switching.
Together with breakers and switch disconnects, ABB now have the most complete DC switching portfolio available for PV solar power.

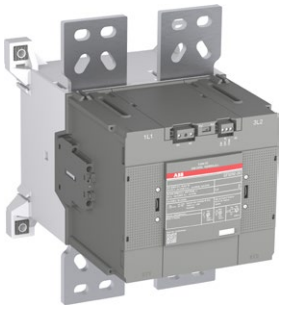
PV solar plant



GF875 ... GF1050 contactors

875 to 1050 A DC-PV3

AC / DC operated with 2 N.O. + 2 N.C. auxiliary contacts

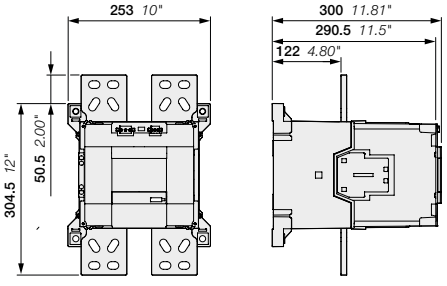


GF1050-30-22

GF875 ... GF1050 contactors are specifically designed for 1500 V DC PV solar central inverters. These contactors are of the block type design with 2 main poles. The main poles are fitted with special arcing contacts enabling bi-directional breaking of currents up to 750 V DC per pole.

- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V DC), only 2 coils to cover control voltages between 24 V AC / 20 V DC ... 60 V AC / DC and 100 ... 250 V AC / DC.
  - can manage large control voltage variations
  - reduced panel energy consumption
  - very distinct closing and opening
  - can withstand short voltage dips and voltage sags.
- built-in surge suppression

IEC	UL/CSA	Rated control circuit voltage Uc		Auxiliary contacts fitted	Type	Order code	Weight
Rated operational current θ ≤ 40 °C 1500 V DC-PV3	General use rating θ ≤ 40 °C 1500 V DC						Pkg (1 pce)
A	A	V 50/60 Hz	V DC				kg
875	210	24...60	20...60	2 2	GF875-20-22-51	1SFL617731R5122	14.3
		100...250	100...250	2 2	GF875-20-22-53	1SFL617731R5322	14.3
1050	210	24...60	20...60	2 2	GF1050-20-22-51	1SFL637731R5122	14.3
		100...250	100...250	2 2	GF1050-20-22-53	1SFL637731R5322	14.3



GF875, GF1050

Main dimensions mm, inches

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GF875 ... GF1050 contactors

Technical data

Main pole - Utilization characteristics according to IEC

Contactor types	AC / DC operated	**GF875**	**GF1050**
Standards		IEC 60947-1 / 60947-4-1 and EN 60947-1 / 60947-4-1	
Rated operational voltage Ue max.		1500 V DC	
Conventional free-air thermal current Ith acc. to IEC 60947-4-1			
For air temperature close to contactor	θ ≤ 60 °C	875 A	1050 A
	θ ≤ 70 °C	650 A	850 A
With conductor cross-sectional area		600 mm²	800 mm²
DC-PV3 Utilization category for air temperature close to contactor Ue max. ≤ 1500, Iscl = 210 A			
	θ ≤ 60 °C	875 A	1050 A
	θ ≤ 70 °C	650 A	850 A
DC-PV4 Utilization category for air temperature close to contactor			
Ue max. ≤ 1500, Iscl = 256 A		325 A	390 A
Maximum electrical switching frequency		15 cycles/h	

Main pole - Utilization characteristics according to UL / CSA

Contactor types	AC / DC operated	**GF875**	**GF1050**
Standards		UL 60947-4-1	
Thermal current Ith		875 A	1050 A
DC general use acc. to UL60947-4-1, Ue max. ≤ 1500		210 A	210 A

General technical data

Contactor types	AC / DC operated	**GF875**	**GF1050**
Rated insulation voltage Ui			
acc. to IEC 60947-4-1		1500 V	
acc. to UL		1500 V	
Rated impulse withstand voltage Uimp.			
Main contacts		8 kV	
Coil terminal		4 kV	
Ambient air temperature close to contactor			
Operation		-40 to +70 °C	
Storage		-40 to +70 °C	
Climatic withstand		acc. to IEC 60068-2-30	
Maximum operating altitude (without derating)		2000 m	
Rated short-time withstand current Icw at 40 °C ambient temp. in free air from a cold state			
	1 s	6218 A	7600 A
	10 s	5184 A	6336 A
	30 s	1450 A	5072 A
	1 min	3109 A	3800 A
	15 min	1139 A	1392 A
Mechanical durability			
Number of operating cycles, 1500 V DC		50 000	
Max. switching frequency		15 cycles/h	

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GF875 ... GF1050 contactors

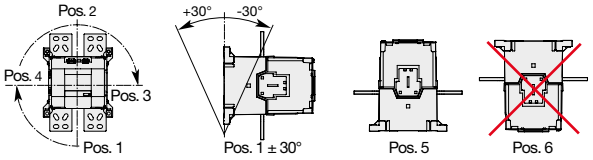
Technical data

Magnet system characteristics

Contactor types	AC / DC operated	GF875	GF1050
Coil operating limits acc. to IEC 60947-4-1	AC or DC supply	At θ ≤ 70 °C 0.85 x Uc min...1.1 x Uc max.	
Rated control circuit voltage Uc Coil Consumption (1)			
AC control voltage			
24...60 V AC 50/60Hz	Max. pull-in value	600 VA	
	Max. holding value	17 VA	
100...250 V AC 50/60Hz	Max. pull-in value	575 VA	
	Max. holding value	15 VA	
DC control voltage			
24...60 V DC	Max. pull-in value	455 W	
	Max. holding value	4 W	
100...250 V DC	Max. pull-in value	450 W	
	Max. holding value	4 W	
Drop-out voltage		55 % of Uc min.	
Dips withstand -20 °C ≤ θ ≤ +60 °C		≥ 20 ms	
Operating time			
Coil supply between A1 - A2			
Between coil energization and:	Main contact opening	50...120 ms	
Between coil de-energization and:	Main contact closing	33...70 ms	
Control input for PLC's			
Between coil energization and:	Main contact closing	40...90 ms	
Between coil de-energization and:	Main contact opening	10...30 ms	

(1) Internal measurement for indication.
Official values pending.

Mounting characteristics and conditions for use

Contactor types	AC / DC operated	GF875	GF1050
Mounting positions			
Control voltage / Ambient temperature			
Mounting positions	1, 1±30°, 2, 3, 4, 5 at θ ≤ 70 °C	0.85 x Uc min...1.1 x Uc max.	
	6	Unauthorized	
Fixing by screws		4 x M5	

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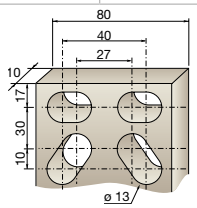
GF875 ... GF1050 contactors

Technical data

Connecting characteristics

Contactor types	AC / DC operated	GF875	GF1050
Main terminals Flat type			
Connection capacity (min. ... max.)			
Main conductors (poles)			
Bars or lugs	L ≤	100 mm	
	Ø >	12 mm	
Connection capacity acc. to UL/CSA	1 or 2 x	busbars only	
Tightening torque Recommended		45 Nm / 398 lb.in	
Max.		49 Nm	
Auxiliary conductors			
Rigid solid	1 x	1...4 mm² (coil terminals : 2.5 mm²)	
	2 x	1...4 mm² (coil terminals : 1.5 mm²)	
Flexible with ferrule	1 x	0.75...2.5 mm²	
	2 x	0.75...2.5 mm²	
Lugs	L ≤	8 mm	
	l >	3.7 mm	
Connection capacity acc. to UL/CSA	1 or 2 x	AWG 18...14	
Tightening torque Recommended		1.00 Nm / 9 lb.in	
Max.		1.20 Nm	
Degree of protection acc. to IEC 60947-1 / EN 60947-1 and IEC 60529 / EN 60529			
Main terminals		IP00	
Coil terminals		IP00	
Screw terminals			
Main terminals		M12	
		Screws and bolts	
Coil terminals (delivered in open position)		M3.5	
	Screwdriver type	Flat Ø 5.5 mm / Pozidriv 2	

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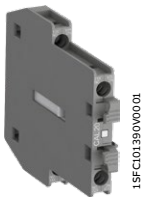
Accessories



CAL20-11

The auxiliary contact blocks are used for the operation of auxiliary circuits and control circuits for standard industrial environments.

Types of auxiliary contact blocks for side mounting:

- CAL 2-pole block, with instantaneous N.O. + N.C. contacts.

For clipping onto the right- and/or left-hand side of the contactors.

The CAL20-11B is a second block for mounting in addition to a first CAL20-11 block, right- and/or left-hand of the GF875 ... GF1050 contactors.

The auxiliary contact blocks are equipped with screw type connecting terminals delivered open, protected against accidental direct contact and bear the corresponding function marking.

For contactors	Auxiliary contacts	Type	Order code	Pkg qty	Weight (1 pce)
					kg
Side-mounted instantaneous auxiliary contact blocks					
GF875, GF1050	1 1	CAL20-11	1SFN010920R1011	1	0.040
	1 1	CAL20-11B	1SFN010920R3011	1	0.040

Auxiliary contact blocks for GF875 ... GF1050 contactors

Technical data

Type			**CAL20**
Contact utilization characteristics according to IEC			
Standards			IEC 60947-5-1 and EN 60947-5-1
Rated insulation voltage Ui acc. to IEC 60947-5-1			690 V
Rated impulse withstand voltage Uimp.			6 kV
Rated operational voltage Ue max.			24...690 V AC
Conventional thermal current Ith - θ ≤ 40 °C			16 A
Rated frequency (without derating)			50/60 Hz
Ie / Rated operational current AC-15			
acc. to IEC 60947-5-1		24-127 V 50/60 Hz	6 A
		220-240 V 50/60 Hz	4 A
		380-440 V 50/60 Hz	3 A
		500-690 V 50/60 Hz	2 A
Making capacity acc. to IEC 60947-5-1			10 x Ie AC-15
Breaking capacity acc. to IEC 60947-5-1			10 x Ie AC-15
Ie / Rated operational current DC-13			
acc. to IEC 60947-5-1		24 V DC	3 A / 72 W
		48 V DC	1.5 A / 72 W
		72 V DC	1 A / 72 W
		110 V DC	0.55 A / 60 W
		125 V DC	0.55 A / 69 W
		220 V DC	0.3 A / 69 W
		250 V DC	0.3 A / 75 W
Short-circuit protection device gG type fuse			10 A
Rated short-time withstand current Icw		for 1.0 s	100 A
θ = 40 °C		for 0.1 s	140 A
Minimum switching capacity			24 V / 50 mA
with failure rate acc. to IEC 60947-5-4			≤ 10-6
Power dissipation per pole at 6 A			0.15 W
Mechanical durability	Number of operating cycles		3 millions
	Max. switching frequency		300 cycles/h
Max. electrical switching frequency		AC-15	300 cycles/h
		DC-13	300 cycles/h

Contact utilization characteristics according to UL / CSA			
Standards			UL 508, CSA C22.2 N°14
Max. operational voltage			600 V AC, 250 V DC
Pilot duty			A600, Q300
AC thermal rated current			10 A
AC maximum volt-ampere making			7200 V A
AC maximum volt-ampere breaking			720 V A
DC thermal rated current			2.5 A
DC maximum volt-ampere making-breaking			69 V A

Connecting characteristics			
Connection capacity (min. ... max.)			
	Solid / stranded	1 x	1...4 mm²
		2 x	1...4 mm²
	Flexible with non insulated ferrule	1 x	0.75...2.5 mm²
		2 x	0.75...2.5 mm²
	Flexible with insulated ferrule	1 x	0.75...2.5 mm²
		2 x	0.75...2.5 mm²
	Lugs	L ≤	8 mm
		l >	3.7 mm
Connection capacity acc. to UL/CSA		1 or 2 x	AWG18...14
Stripping length			9 mm
Tightening torque			1 Nm
Degree of protection			
acc. to IEC 60947-1 / EN 60947-1 and IEC 60529 / EN 60529			IP20
Screw terminals			Delivered in open position, screws of unused terminals must be tightened
All terminals			M3.5
Screwdriver type			Flat Ø 5.5 / Pozidriv 2

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You can find the address of your local sales organization on the ABB home page

http://www.abb.com/lowvoltage

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