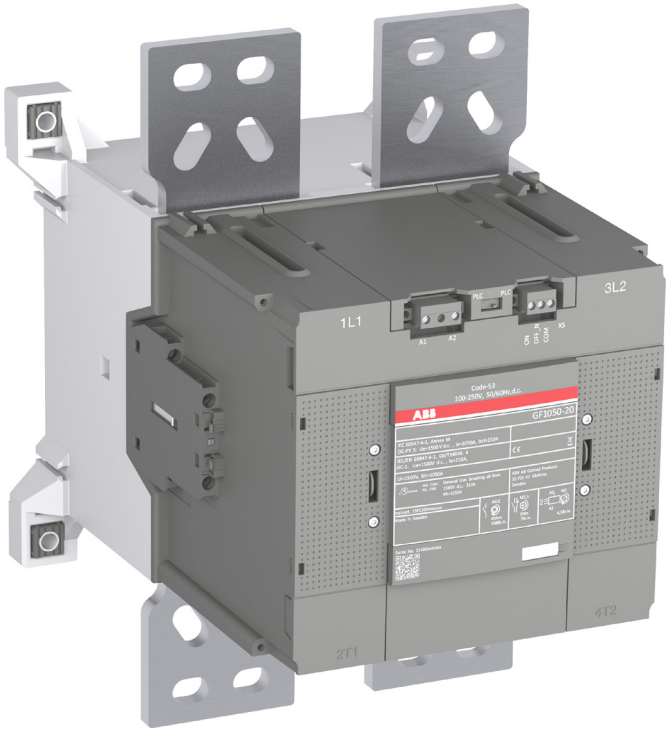
Contactors for DC switching

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 1000 V 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

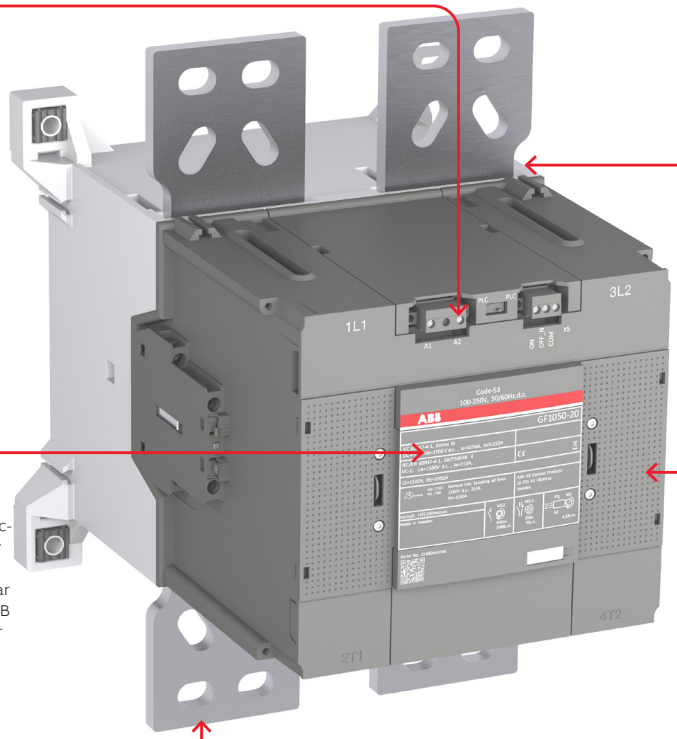
ABB's GF contactor complies with all major international standards.
It features AC/DC controlled wide voltage range coils together with easily accessible coil terminals to make easier and quicker product selection and installation.

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 ... 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 1325 A 1500 V DC-PV3

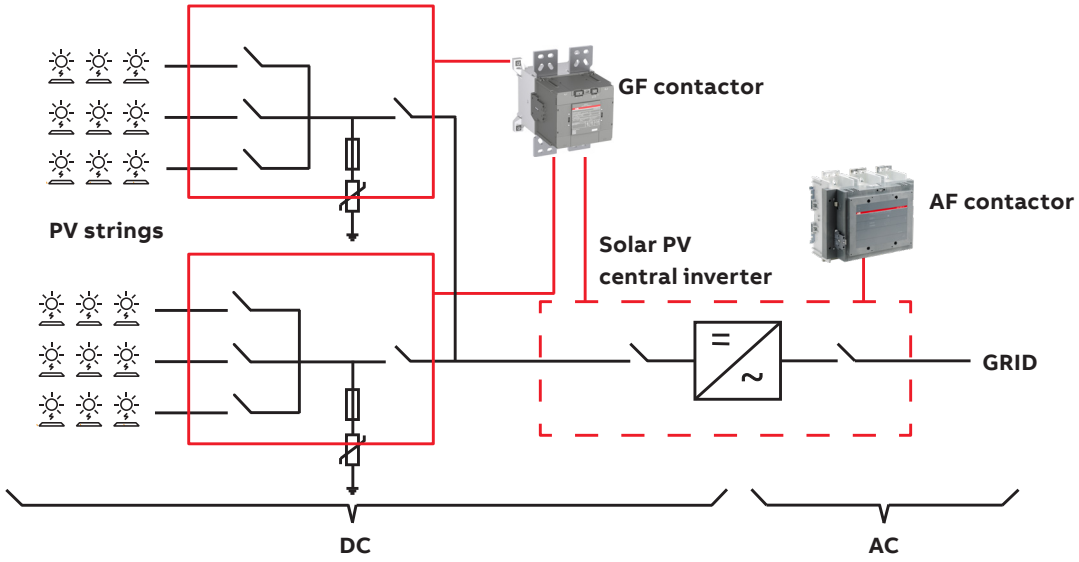
The new GF range of DC contactors extends up to 1325 A for DC-PV3.

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.

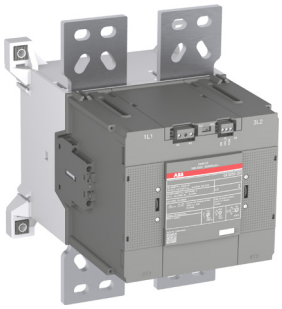
PV solar plant



GF875 ... GF1325 AC / DC operated

875 to 1325 A DC-PV3

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

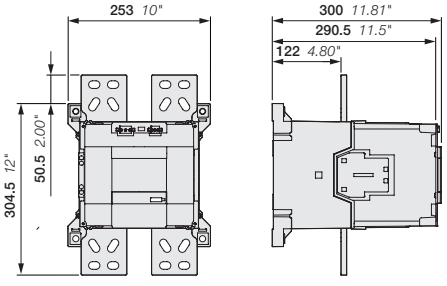


GF1050-30-22

GF875 ... GF1325 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 ... 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 □ ≤ 40 °C 1500 V DC-PV3	General use rating □ ≤ 40 °C 1500 V DC						Pkg (1 pce)
A	A	V 50/60 Hz	V DC				kg
875	210	24...60	24...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	24...60	2 2	GF1050-20-22-51	1SFL637731R5122	14.3
		100...250	100...250	2 2	GF1050-20-22-53	1SFL637731R5322	14.3
1325	210	24...60	24...60	2 2	GF1325-20-22-51	1SFL647731R5122	14.3
		100...250	100...250	2 2	GF1325-20-22-53	1SFL647731R5322	14.3



GF875, GF1050

Main dimensions mm, inches

GF875 ... GF1325 contactors

Technical data

Main pole - Utilization characteristics according to IEC

Contactor types	AC / DC operated	GF875	GF1050	GF1325
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	1325 A
	θ ≤ 70 °C	650 A	850 A	1050 A
With conductor cross-sectional area		600 mm²	800 mm²	1000 mm²
DC-PV3 Utilization category for air temperature close to contactor Ue max. ≤ 1500, Iscl = 210 A				
	θ ≤ 60 °C	875 A	1050 A	1325 A
	θ ≤ 70 °C	650 A	850 A	1050 A
DC-PV4 Utilization category for air temperature close to contactor Ue max. ≤ 1500, Iscl = 256 A		325 A	390 A	490 A
Maximum electrical switching frequency		15 cycles/h		

Main pole - Utilization characteristics according to UL / CSA

Contactor types	AC / DC operated	GF875	GF1050	GF1325
Standards		UL 60947-4-1		
Thermal current Ith		875 A	1050 A	1325 A
DC general use acc. to UL60947-4-1, Ue max. ≤ 1500		210 A	210 A	210 A

General technical data

Contactor types	AC / DC operated	GF875	GF1050	GF1325
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		
Pollution degree		3		
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	9500 A
	10 s	5184 A	6336 A	7920 A
	30 s	1450 A	5072 A	6340 A
	1 min	3109 A	3800 A	4750 A
	15 min	1139 A	1392 A	1740 A
Mechanical durability				
Number of operating cycles, 1500 V DC		50 000		
Max. switching frequency		15 cycles/h		

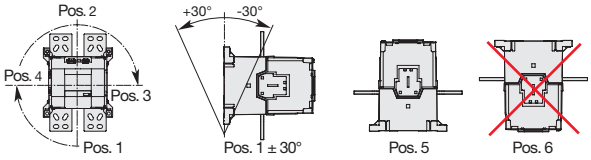
GF875 ... GF1325 contactors
Technical data

Magnet system characteristics

Contactor types	AC / DC operated	GF875	GF1050	GF1325
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	600 VA		
	Max. holding value	23 VA		
DC control voltage				
24...60 V DC	Max. pull-in value	700 W		
	Max. holding value	12 W		
100...250 V DC	Max. pull-in value	505 W		
	Max. holding value	12 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.

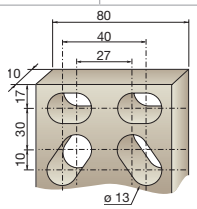
Mounting characteristics and conditions for use

Contactor types	AC / DC operated	GF875	GF1050	GF1325
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		

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/Stranded	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	

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

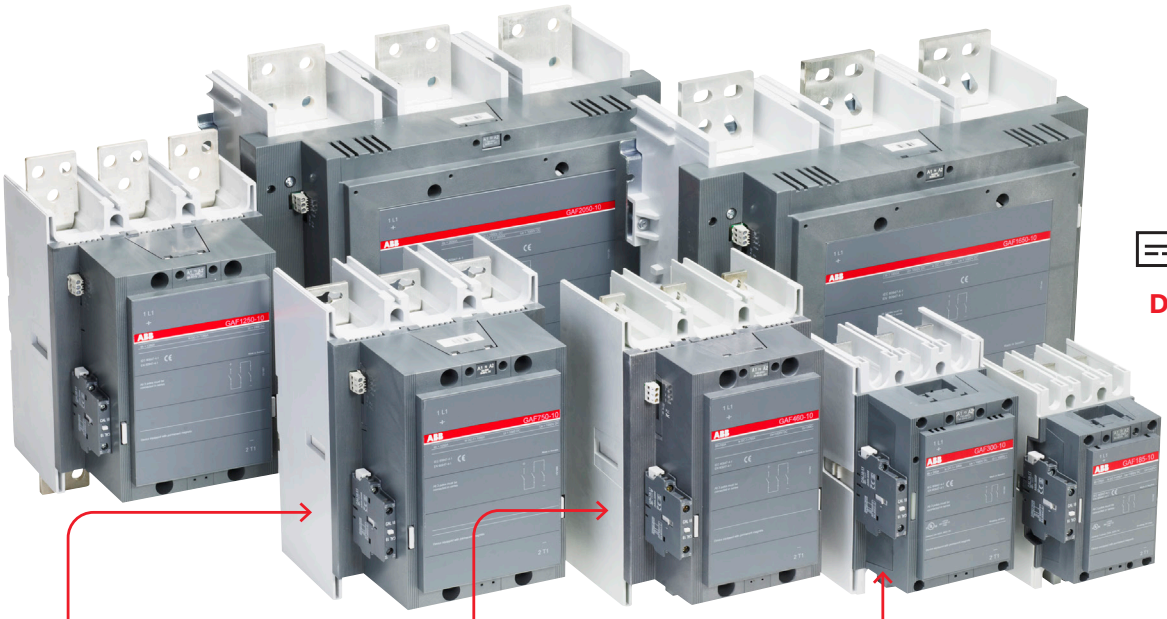
Type			CAL20
Contact utilization characteristics according to IEC			
Standards			IEC 60947-5-1 and EN 60947-5-1
Rated insulation voltage Ui acc. to IEC 60947-5-1			690 V
Rated impulse withstand voltage Uimp.			6 kV
Rated operational voltage Ue max.			24...690 V AC
Conventional thermal current Ith - θ ≤ 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.)			
	Rigid 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

GAF contactors

The compact efficient way to switch DC loads



DC

Up to 2050 A 1000 V DC-1

The GAF range of DC contactors extends from 250 A up to 2050 A for DC-1 and UL DC general use at 1000 V.

Proven technology

The GAF range of contactor is based on the tested and well proven AFcontactor range. The GAF share all accessories with the AF range, reducing the number of parts needed.

Easy selection

The GAF contactors feature ABBs AF technology and all of its features. With only four coils the entire voltage range of 20 V DC and 24 V AC to 500 V AC / DC is covered. The built in surge suppression takes away the need of a separate surge suppressor. All to enable easier selection of contactors.

PV plant applications for DC switching

Contactors are typically selected for applications that need remote control and switching of the central inverter's DC side at least once per day. Application examples include: disconnection of the inverter from PV strings; or changing the string configuration to increase plant capacity.

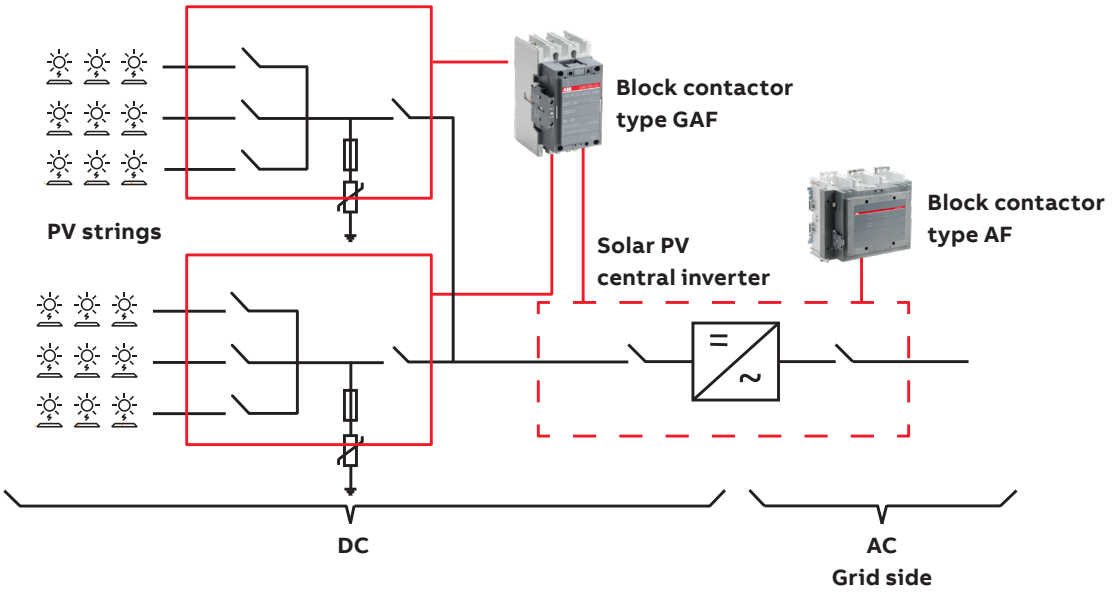
GAF contactors

The compact efficient way to switch DC loads

Optimised for central inverters

ABB offers the widest range of compact contactors for DC load switching in low voltage power distribution applications. Due to their breaking performance for DC circuits, GAF contactors can switch DC loads of up to 2050 A 1000 V DC-1.

PV solar plant



Contactors for DC switching applications

DC-1, DC-3, DC-5 applications according to IEC 60947-4-1

The circuit switching on DC is more difficult than on AC, as alternating current go to zero according to the frequency of the supply source while DC current has a continuous value.
The main parameters to be considered for selecting a contactor are the current, the voltage and the L/R time constant of the controlled load.

Time constant and utilization categories
In DC applications, the nature of load to switch (resistor, inductance or a combination) is characterized by the ratio of the inductance to the resistance (L (inductance of operated circuit) / R (resistance of operated circuit) = mH/Ω = ms)
This ratio L/R is called the time constant of the circuit.

DC current utilization categories are defined according to IEC 60947-4-1:
- DC-1 non inductive or slightly inductive loads, resistance furnaces (L/R ≤ 1 ms)
- DC-3 shunt motors: starting, plugging, inching, dynamic breaking of DC motors (L/R ≤ 2 ms)
- DC-5 series motors: starting, plugging, inching, dynamic breaking of DC motors (L/R ≤ 7.5 ms).

The higher the time constant value is, the more difficult it is to break the arc.
The addition of a resistor in parallel with an inductive winding helps in the elimination of the arcs, by reducing the time constant.

Operational voltage
- The higher the operational voltage value is, the more difficult it is to break the arc.
- The use of main poles connected in series will allow to increase the value of switched voltage.

However, the maximum switched voltage must be within the max operational voltage of the contactor.
All the poles required for breaking must be connected in series between the load and the source polarity not linked to earth (or chassis) (see recommended connection diagrams).

ABB offer a large choice of possibilities for DC switching applications (see selection tables):
- Standard 3-pole or 4-pole contactors with either 1- pole breaking or breaking with poles connected in series.
- Special contactors designed for DC breaking with permanent magnets fitted on the main poles for use with the 3 poles connected in series and considered as 1-pole devices:
  - GA75 and GAE75 contactors: the 3 poles are connected in series via two supplied and fitted insulated connections (25 mm^2)
  - GAF145 … GAF2050 contactors: the 3 poles must be connected in series by the user according to conductor cross-sectional area (refer to main pole technical data) or by using LP connection bars to be ordered separately.

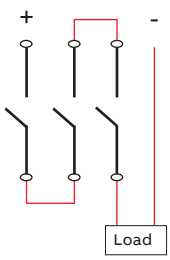
Selection tables
The enclosed selection tables will guide your choice through all contactor variants according to utilization category, for operational voltage up to 1000 V DC-1 and operational current up to 2050 A in ambient temperatures from -25 °C up to 40 °C.
For higher values of current or voltage or heavy DC switching applications see bar mounted R contactors.

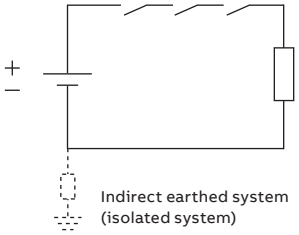
Connection diagrams

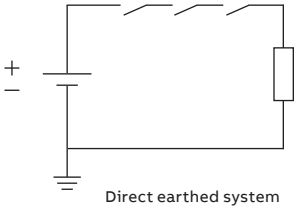
Connection diagrams

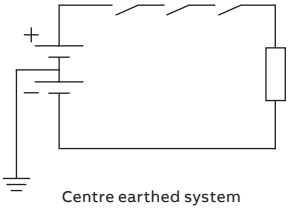
Recommended connection

In the example below, the 3 poles are connected in series without the load in between.
This connection is recommended in systems according to the following configurations.



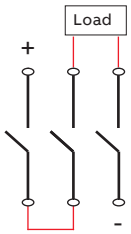


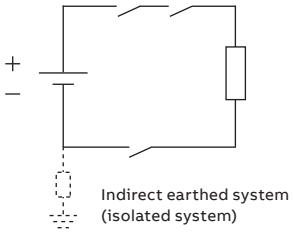




Alternative connection (not possible for GA75, GAE75)

The load could be placed in between the contacts in a indirect earthed system. If not connected according to the configuration below, a fault to earth could result in one or two contacts breaking the full load which the contactor is not approved for.





Points to consider

The above relates to power circuit switching. The SCPD (Short Circuit Protection Device) must comply with applicable protection rules.

Polarity:

For all GA, GAE, GAF types, connection polarities must be respected.
(See instruction leaflet and see markings on the main terminals or the contactor front)

AF09 ... AF96 contactors

DC circuit switching

General

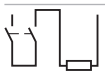
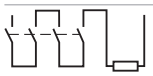
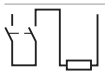
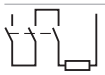
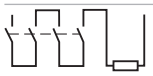
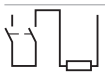
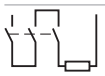
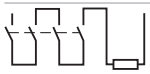
The arc switching on DC is more difficult than on AC.

- For selecting a contactor it is essential to determine the current, the voltage and the L/R time constant of the controlled load
- For information, typical time constant values are quoted hereafter: non inductive loads such as resistance furnaces (L/R ≈ 1 ms), inductive loads such as shunt motors (L/R ≈ 2 ms) or series motors (L/R ≈ 7.5 ms)
- The addition of a resistor in parallel with an inductive winding helps in the elimination of the arcs
- All the poles required for breaking must be connected in series between the load and the source polarity not linked to earth (or chassis).

Technical data

- The tables indicate for the standard contactors the Ie max. operating currents depending on: the utilization category (i.e. L/R) DC-1, DC-3, DC-5 as defined in the IEC 60947-4-1 publication, the operating voltage Ue and the pole coupling details. Ampere values quoted in these tables are valid for a -25...+70 °C temperature close to the contactors, as long as these values do not exceed the AC-1 Ampere values for the corresponding ambient temperature
- Max. switching frequency: 300 cycles/h.

Selection table

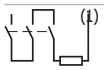
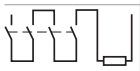
Contactor types		AF09	AF12	AF16	AF26		AF30	AF38		AF40	AF52	AF65	AF80	AF96
		3 or 4-pole			3-pole	4-pole	3-pole	3-pole	4-pole	3-pole	3-pole	3-pole	3-pole	3-pole
Utilization category DC-1, L/R ≤ 1 ms														
	≤ 72 V	25 A	27 A	30 A	45 A	45 A	50 A	50 A	55 A	70 A	100 A	105 A	125 A	130 A
	110 V	10 A	15 A	20 A	-	-	-	-	-	-	-	-	-	-
	220 V	-	-	-	-	-	-	-	-	-	-	-	-	-
	≤ 72 V	25 A	27 A	30 A	45 A	45 A	50 A	50 A	55 A	70 A	100 A	105 A	125 A	130 A
	110 V	25 A	27 A	30 A	45 A	45 A	50 A	50 A	55 A	70 A	100 A	105 A	125 A	130 A
	220 V	10 A	15 A	20 A	-	-	-	-	-	-	-	-	-	-
	≤ 72 V	25 A	27 A	30 A	45 A	45 A	50 A	50 A	55 A	70 A	100 A	105 A	125 A	130 A
	110 V	25 A	27 A	30 A	45 A	45 A	50 A	50 A	55 A	70 A	100 A	105 A	125 A	130 A
	220 V	25 A	27 A	30 A	45 A	45 A	50 A	50 A	55 A	70 A	100 A	105 A	125 A	130 A
	≤ 72 V	25 A	-	30 A	-	45 A	-	-	55 A	-	-	-	-	-
	110 V	25 A	-	30 A	-	45 A	-	-	55 A	-	-	-	-	-
	220 V	25 A	-	30 A	-	45 A	-	-	55 A	-	-	-	-	-
	440 V	10 A	-	20 A	-	-	-	-	-	-	-	-	-	-
Utilization category DC-3, L/R ≤ 2 ms														
	≤ 72 V	25 A	27 A	30 A	45 A	-	50 A	50 A	-	70 A	100 A	105 A	125 A	130 A
	110 V	6 A	7 A	8 A	-	-	-	-	-	-	-	-	-	-
	220 V	-	-	-	-	-	-	-	-	-	-	-	-	-
	≤ 72 V	25 A	27 A	30 A	45 A	-	50 A	50 A	-	70 A	100 A	105 A	125 A	130 A
	110 V	25 A	27 A	30 A	45 A	-	50 A	50 A	-	70 A	100 A	105 A	125 A	130 A
	220 V	6 A	7 A	8 A	-	-	-	-	-	-	-	-	-	-
	≤ 72 V	25 A	27 A	30 A	45 A	-	50 A	50 A	-	70 A	100 A	105 A	125 A	130 A
	110 V	25 A	27 A	30 A	45 A	-	50 A	50 A	-	70 A	100 A	105 A	125 A	130 A
	220 V	25 A	27 A	30 A	45 A	-	50 A	50 A	-	70 A	100 A	105 A	125 A	130 A
	≤ 72 V	25 A	-	30 A	-	-	-	-	-	-	-	-	-	-
	110 V	25 A	-	30 A	-	-	-	-	-	-	-	-	-	-
	220 V	25 A	-	30 A	-	-	-	-	-	-	-	-	-	-
	440 V	6 A	-	8 A	-	-	-	-	-	-	-	-	-	-
Utilization category DC-5, L/R ≤ 7.5 ms														
	≤ 72 V	9 A	12 A	16 A	20 A	-	25 A	25 A	-	70 A	100 A	105 A	125 A	130 A
	110 V	4 A	4 A	4 A	-	-	-	-	-	-	-	-	-	-
	220 V	-	-	-	-	-	-	-	-	-	-	-	-	-
	≤ 72 V	25 A	27 A	30 A	45 A	-	50 A	50 A	-	70 A	100 A	105 A	125 A	130 A
	110 V	10 A	15 A	20 A	45 A	-	50 A	50 A	-	70 A	100 A	105 A	125 A	130 A
	220 V	4 A	4 A	4 A	-	-	-	-	-	-	-	-	-	-
	≤ 72 V	25 A	27 A	30 A	45 A	-	50 A	50 A	-	70 A	100 A	105 A	125 A	130 A
	110 V	25 A	27 A	30 A	45 A	-	50 A	50 A	-	70 A	100 A	105 A	125 A	130 A
	220 V	9 A	12 A	16 A	20 A	-	25 A	25 A	-	70 A	100 A	105 A	125 A	130 A
	≤ 72 V	25 A	-	30 A	-	-	-	-	-	-	-	-	-	-
	110 V	25 A	-	30 A	-	-	-	-	-	-	-	-	-	-
	220 V	10 A	-	20 A	-	-	-	-	-	-	-	-	-	-
	440 V	4 A	-	4 A	-	-	-	-	-	-	-	-	-	-

For additional ratings ≥ 440 V, please consult us.
Note: For AFS09 ... AFS96 safety contactors, DC switching rating are the same as AF09 ... AF96 3-pole contactors.

AF116 ... AF2650 contactors

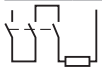
DC circuit switching

Selection table

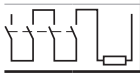
Contactor types		AF116	AF140	AF146	AF190	AF205	AF265	AF305	AF370	AF400	AF460	AF580	AF750	AF1250	AF1350	AF1650	AF2050	AF2650
		3 or 4-pole		3-pole	3 or 4-pole					3-pole								
Utilization category DC-1, L/R ≤ 1 ms																		
	≤ 72 V	160	200	200	250	350	400	500	520	600 A	700 A	800 A	1050 A	1250 A	1350 A	1650 A	2050 A	2650 A
	90 V	160	200	200	250	350	400	500	520	-	-	-	-	-	-	-	-	-
	100 V	-	-	-	250	350	400	500	520	-	-	-	-	-	-	-	-	-
	110 V	-	-	-	-	-	400	500	520	600 A	700 A	800 A	1050 A	1250 A	1350 A	1650 A	2050 A	2650 A
	≤ 72 V	160	200	200	250	350	400	500	520	600 A	700 A	800 A	1050 A	1250 A	1350 A	1650 A	2050 A	2650 A
	110 V	160	200	200	250	350	400	500	520	600 A	700 A	800 A	1050 A	1250 A	1350 A	1650 A	2050 A	2650 A
	175 V	160	200	200	250	350	400	500	520	600 A	700 A	800 A	1050 A	-	-	-	-	-
	200 V	-	-	-	250	350	400	500	520	600 A	700 A	800 A	1050 A	-	-	-	-	-
	220 V	-	-	-	-	-	400	500	520	600 A	700 A	800 A	1050 A	-	-	-	-	-
 (1)	≤ 72 V	160	200	200	250	350	400	500	520	600 A	700 A	800 A	1050 A	1250 A	1350 A	1650 A	2050 A	2650 A
	110 V	160	200	200	250	350	400	500	520	600 A	700 A	800 A	1050 A	1250 A	1350 A	1650 A	2050 A	2650 A
	220 V	160	200	200	250	350	400	500	520	600 A	700 A	800 A	1050 A	1250 A	1350 A	1650 A	2050 A	2650 A
	260 V	160	200	200	250	350	400	500	520	600 A	700 A	800 A	1050 A	1250 A	1350 A	1650 A	2050 A	2650 A
	300 V	-	-	-	250	350	400	500	520	600 A	700 A	800 A	1050 A	1250 A	1350 A	1650 A	2050 A	2650 A
	340 V	-	-	-	-	-	400	500	520	600 A	700 A	800 A	1050 A	1250 A	1350 A	1650 A	2050 A	2650 A
	440 V	-	-	-	-	-	-	-	-	600 A	700 A	800 A	1050 A	1250 A	1350 A	1650 A	2050 A	2650 A
	600 V	-	-	-	-	-	-	-	-	600 A	700 A	800 A	1050 A	1250 A	1350 A	1650 A	2050 A	2650 A
	780 V	-	-	-	-	-	-	-	-	600 A	700 A	800 A	1050 A	1250 A	1350 A	1650 A	2050 A	2650 A
	850 V	-	-	-	-	-	-	-	-	-	-	800 A	1050 A	1250 A	1350 A	1650 A	2050 A	2650 A
	< 350 V	200	200	-	250	350	400	500	520	-	-	-	-	-	-	-	-	-
	400 V	-	-	-	250	350	400	500	520	-	-	-	-	-	-	-	-	-
	440 V	-	-	-	-	-	400	500	520	-	-	-	-	-	-	-	-	-

(1) AF2650 at 780 V DC = 2650 A

Utilization category DC-3, L/R ≤ 2 ms

	≤ 72 V	-	-		-	-	-	-	-	600 A	700 A	800 A	1050 A	1250 A	1350 A	-	-	-
	110 V	-	-		-	-	-	-	-	600 A	700 A	800 A	1050 A	1250 A	1350 A	-	-	-
	≤ 72 V	145 A	160 A		250 A	275 A	350 A	400 A	450 A	600 A	700 A	800 A	1050 A	1250 A	1350 A	-	-	-
	110 V	145 A	160 A		250 A	275 A	350 A	400 A	450 A	600 A	700 A	800 A	1050 A	1250 A	1350 A	-	-	-
	220 V	-	-		-	-	-	-	-	600 A	700 A	800 A	1050 A	-	-	-	-	-
	≤ 72 V	145 A	160 A		250 A	275 A	350 A	400 A	450 A	600 A	700 A	800 A	1050 A	1250 A	1350 A	-	-	-
	110 V	145 A	160 A		250 A	275 A	350 A	400 A	450 A	600 A	700 A	800 A	1050 A	1250 A	1350 A	-	-	-
	220 V	145 A	160 A		250 A	275 A	350 A	400 A	450 A	600 A	700 A	800 A	1050 A	1250 A	1350 A	-	-	-
	440 V	-	-		-	-	-	-	-	600 A	700 A	800 A	1050 A	1250 A	1350 A	-	-	-
	600 V	-	-		-	-	-	-	-	600 A	700 A	800 A	1050 A	1250 A	1350 A	-	-	-
	320 V	145 A	160 A	-	250 A	275 A	350 A	400 A	450 A	-	-	-	-	-	-	-	-	-

Utilization category DC-5, L/R ≤ 7.5 ms

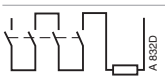
	≤ 72 V	-	-		-	-	-	-	-	600 A	700 A	800 A	1050 A	1250 A	1350 A	-	-	-
	110 V	-	-		-	-	-	-	-	600 A	700 A	800 A	1050 A	1250 A	1350 A	-	-	-
	≤ 72 V	145 A	160 A		250 A	275 A	350 A	400 A	450 A	600 A	700 A	800 A	1050 A	1250 A	1350 A	-	-	-
	110 V	145 A	160 A		250 A	275 A	350 A	400 A	450 A	600 A	700 A	800 A	1050 A	1250 A	1350 A	-	-	-
	220 V	-	-		-	-	-	-	-	600 A	700 A	800 A	1050 A	-	-	-	-	-
	≤ 72 V	145 A	160 A		250 A	275 A	350 A	400 A	450 A	600 A	700 A	800 A	1050 A	1250 A	1350 A	-	-	-
	110 V	145 A	160 A		250 A	275 A	350 A	400 A	450 A	600 A	700 A	800 A	1050 A	1250 A	1350 A	-	-	-
	220 V	145 A	160 A		250 A	275 A	350 A	400 A	450 A	600 A	700 A	800 A	1050 A	1250 A	1350 A	-	-	-
	440 V	-	-		-	-	-	-	-	600 A	700 A	800 A	1050 A	1250 A	1350 A	-	-	-
	600 V	-	-		-	-	-	-	-	600 A	700 A	800 A	1050 A	1250 A	1350 A	-	-	-
	320 V	145 A	160 A	-	250 A	275 A	350 A	400 A	450 A	-	-	-	-	-	-	-	-	-

For additional ratings ≥ 440 V, please consult us.

EK550, EK1000 contactors

DC circuit switching

Selection table

Contactor types			EK550	EK1000
Utilization category DC-1, L/R ≤ 1 ms				
				
	≤ 72 V	A	550	–
	110 V	A	550	–
	≤ 72 V	A	800	–
	110 V	A	800	–
	220 V	A	800	–
	≤ 72 V	A	800	–
	110 V	A	800	–
	220 V	A	800	–
	440 V	A	650	–
	600 V	A	650	–
	≤ 72 V	A	800	–
	110 V	A	800	–
	220 V	A	800	–
	440 V	A	650	–
	600 V	A	650	–
Utilization category DC-3, L/R ≤ 2 ms				
				
	≤ 72 V	A	550	–
	≤ 72 V	A	650	–
	110 V	A	650	–
	220 V	A	650	–
	≤ 72 V	A	650	–
	110 V	A	650	–
	220 V	A	650	–
	440 V	A	650	–
	600 V	A	650	–
	≤ 72 V	A	650	–
	110 V	A	650	–
	220 V	A	650	–
	440 V	A	650	–
	600 V	A	650	–
Utilization category DC-5, L/R ≤ 7.5 ms				
	≤ 72 V	A	650	–
	110 V	A	650	–
	220 V	A	650	–
	≤ 72 V	A	650	–
	110 V	A	650	–
	220 V	A	650	–
	440 V	A	650	–
	600 V	A	650	–
	≤ 72 V	A	650	–
	110 V	A	650	–
	220 V	A	650	–
	440 V	A	650	–
	600 V	A	650	–

Notes

GA75 1-pole contactors
100 A DC-1
AC operated

GA75-10-11

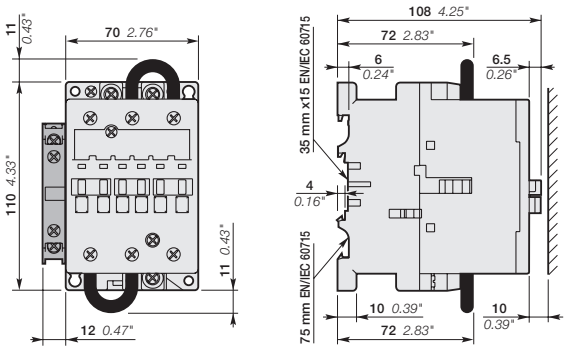
GA75 contactors are designed for controlling shunt or series motors and resistive or slightly inductive loads up to 1000 V DC.

These contactors are of the block type design with 3 main poles delivered connected in serie.

- main poles arc chutes fitted with permanent magnets specially designed for DC breaking. The connection polarities must be respected.
- control circuit: AC operated
- add-on auxiliary contact blocks for side mounting and a wide range of accessories.

IEC Rated operational current ≤ 55 °C 440 V DC-1 A	UL / CSA General use rating 440 V DC A	Rated control circuit voltage Uc (1) V 50 Hz	 V 60 Hz	Auxiliary contacts fitted	Type	Order code	Weight Pkg (1 pce) kg
100	100	24	24	0 0	GA75-10-00	1SBL411025R8100	1.220
				1 1	GA75-10-11	1SBL411025R8111	1.260
		48	48	0 0	GA75-10-00	1SBL411025R8300	1.220
				1 1	GA75-10-11	1SBL411025R8311	1.260
		110	110...120	0 0	GA75-10-00	1SBL411025R8400	1.220
				1 1	GA75-10-11	1SBL411025R8411	1.260
		220...230	230...240	0 0	GA75-10-00	1SBL411025R8000	1.220
				1 1	GA75-10-11	1SBL411025R8011	1.260
		230...240	240...260	0 0	GA75-10-00	1SBL411025R8800	1.220
				1 1	GA75-10-11	1SBL411025R8811	1.260
		380...400	400...415	0 0	GA75-10-00	1SBL411025R8500	1.220
				1 1	GA75-10-11	1SBL411025R8511	1.260
		400...415	415...440	0 0	GA75-10-00	1SBL411025R8600	1.220
				1 1	GA75-10-11	1SBL411025R8611	1.260

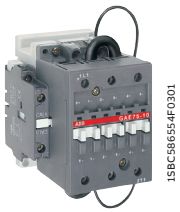
(1) Other control voltages see voltage codes table.



GA75-10-11

Main dimensions mm, inches

GAE75 1-pole contactors
100 A DC-1
DC operated



GAE75-10-11

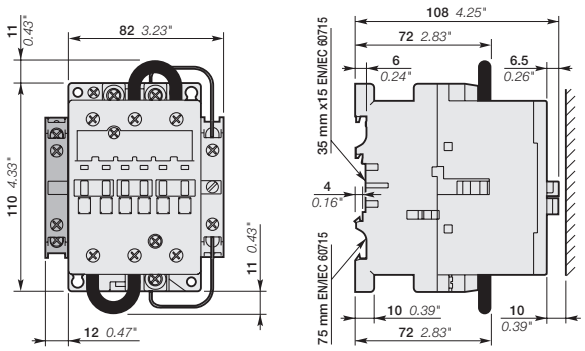
GAE75 contactors are designed for controlling shunt or series motors and resistive or slightly inductive loads up to 1000 V DC.

These contactors are of the block type design with 3 main poles delivered connected in serie.

- main poles arc chutes fitted with permanent magnets specially designed for DC breaking. The connection polarities must be respected.
- control circuit: DC operated with double winding coil (and factory mounted lagging contact for "holding" winding insertion)
- add-on auxiliary contact blocks for side mounting and a wide range of accessories

IEC	UL/CSA	Rated control circuit voltage Uc (1)	Auxiliary contacts fitted	Type	Order code	Weight
Rated operational current ≤ 55 °C 440 V DC-1	General use rating 440 V DC					Pkg (1 pce)
A	A	V DC				kg
100	100	12	0 0	GAE75-10-00	1SBL419025R8000	1.260
			1 1	GAE75-10-11	1SBL419025R8011	1.300
		24	0 0	GAE75-10-00	1SBL419025R8100	1.260
			1 1	GAE75-10-11	1SBL419025R8111	1.300
		48	0 0	GAE75-10-00	1SBL419025R8300	1.260
			1 1	GAE75-10-11	1SBL419025R8311	1.300
		110	0 0	GAE75-10-00	1SBL419025R8600	1.260
			1 1	GAE75-10-11	1SBL419025R8611	1.300
		125	0 0	GAE75-10-00	1SBL419025R8700	1.260
			1 1	GAE75-10-11	1SBL419025R8711	1.300
		220	0 0	GAE75-10-00	1SBL419025R8800	1.260
			1 1	GAE75-10-11	1SBL419025R8811	1.300
		240	0 0	GAE75-10-00	1SBL419025R8900	1.260
			1 1	GAE75-10-11	1SBL419025R8911	1.300

(1) Other control voltages see voltage codes table.



GAE75-10-11

Main dimensions mm, inches

GAF185 ... GAF300 1-pole (3-pole in serie) contactors
250 to 400 A DC-1

AC / DC operated with 1 N.O. + 1 N.C. auxiliary contacts

GAF185-10-11

GAF300-10-11

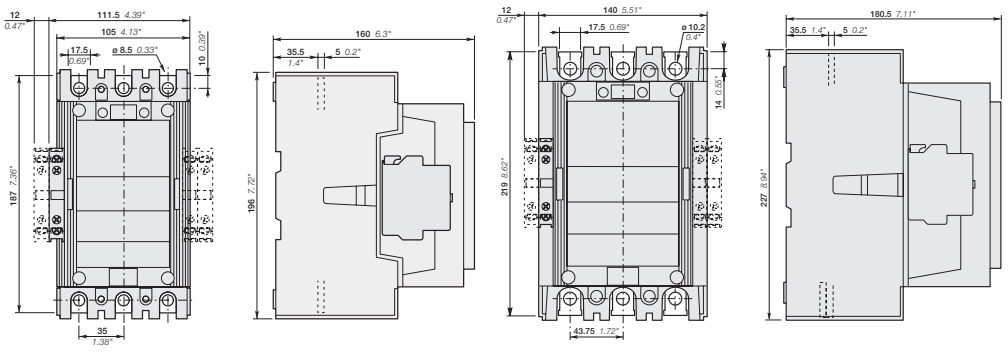
GAF185 ... GAF300 contactors are designed for controlling resistive or slightly inductive loads up to 1000 V DC.

These contactors are of the block type design with 3 main poles for connection in series by the user according to conductor cross-sectional area or by using LP connection bars to be ordered separately.

- main poles arc chutes fitted with permanent magnets specially designed for DC breaking. The connection polarities must be respected.
- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC), only 3 coils to cover control voltages between 48...250 V 50/60 Hz and 20...250 V DC
  - can manage large control voltage variations
  - reduced panel energy consumption
  - very distinct closing and opening
  - can withstand short voltage dips and voltage sags (SEMI F47 conditions of use on request).
- built-in surge suppression
- add-on auxiliary contact blocks for side mounting and a wide range of accessories.

IEC	UL / CSA	Rated control circuit voltage Uc		Auxiliary contacts fitted	Type	Order code	Weight
Rated operational current ≤ 55 °C 1000 V DC-1	General use rating ≤ 40 °C 1000 V DC						Pkg (1 pce)
A	A	V 50/60 Hz	V DC				kg
250	250	-	20...60	1 1	GAF185-10-11 (1)	1SFL497025R7211	3.600
		48...130	48...130	1 1	GAF185-10-11	1SFL497025R6911	3.600
		100...250	100...250	1 1	GAF185-10-11	1SFL497025R7011	3.600
400	400	-	20...60	1 1	GAF300-10-11 (1)	1SFL557025R7211	6.200
		48...130	48...130	1 1	GAF300-10-11	1SFL557025R6911	6.200
		100...250	100...250	1 1	GAF300-10-11	1SFL557025R7011	6.200

(1) The connection polarities indicated close to the coil terminals must be respected: A1 for the positive pole and A2 for the negative pole.



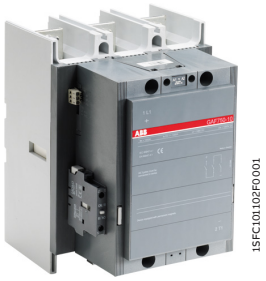
GAF185 GAF300

Main dimensions mm, inches

GAF460 ... GAF750 1-pole (3-pole in serie) contactors
600 to 875 A DC-1

AC / DC operated with 1 N.O. + 1 N.C. auxiliary contacts

GAF460-10-11



GAF750-10-11

GAF460 ... GAF750 contactors are designed for controlling resistive or slightly inductive loads up to 1000 V DC.

These contactors are of the block type design with 3 main poles for connection in series by the user according to conductor cross-sectional area or by using LP connection bars to be ordered separately.

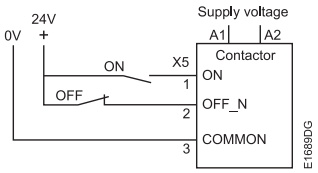
- main poles arc chutes fitted with permanent magnets specially designed for DC breaking. The connection polarities must be respected.
- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC), only 4 coils to cover control voltages between 48...500 V 50/60 Hz and 24...500 V DC
  - can manage large control voltage variations
  - reduced panel energy consumption
  - very distinct closing and opening
  - can withstand short voltage dips and voltage sags (SEMI F47 conditions of use on request).
- built-in surge suppression
- add-on auxiliary contact blocks for side mounting and a wide range of accessories.

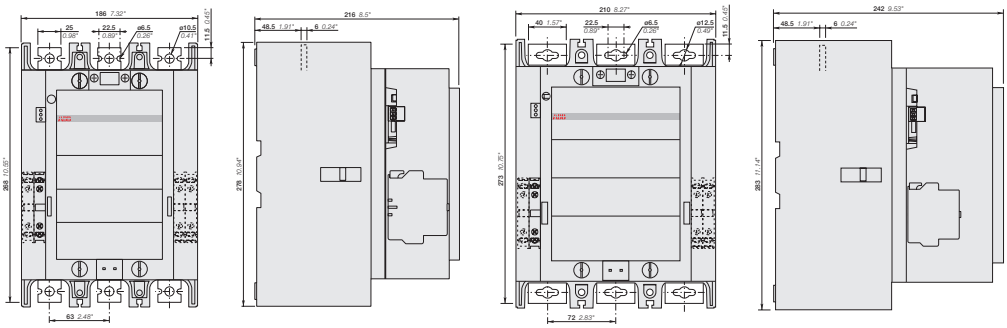
IEC	UL / CSA	Rated control circuit voltage Uc		Auxiliary contacts fitted	Type	Order code	Weight
Rated operational current ≤ 55 °C 1000 V DC-1	General use rating ≤ 40 °C 1000 V DC						Pkg (1 pce)
A	A	V 50/60 Hz	V DC				kg
600	650	-	24...60	1 1	GAF460-10-11 (1)	1SFL597025R6811	12.000
		48...130	48...130	1 1	GAF460-10-11	1SFL597025R6911	12.000
		100...250	100...250	1 1	GAF460-10-11	1SFL597025R7011	12.000
		250...500	250...500	1 1	GAF460-10-11	1SFL597025R7111	12.000
875	900	-	24...60	1 1	GAF750-10-11 (1)	1SFL637025R6811	15.000
		48...130	48...130	1 1	GAF750-10-11	1SFL637025R6911	15.000
		100...250	100...250	1 1	GAF750-10-11	1SFL637025R7011	15.000
		250...500	250...500	1 1	GAF750-10-11	1SFL637025R7111	15.000

(1) The connection polarities indicated close to the coil terminals must be respected: A1 for the positive pole and A2 for the negative pole.

GAF460 ... GAF750 are equipped with low voltage inputs for control, for example by a PLC.

Control inputs





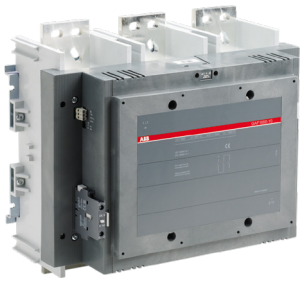
GAF460 GAF750

Main dimensions mm, inches

GAF1250 ... GAF2050 1-pole (3-pole in serie) contactors
1040 to 1750 A DC-1

AC / DC operated with 1 N.O. + 1 N.C. auxiliary contacts

GAF1250-10-11



GAF1650-10-11

GAF1250 ... GAF2050 contactors are designed for controlling resistive or slightly inductive loads up to 1000 V DC.

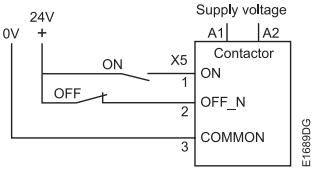
These contactors are of the block type design with 3 main poles for connection in series by the user according to conductor cross-sectional area or by using LP connection bars to be ordered separately.

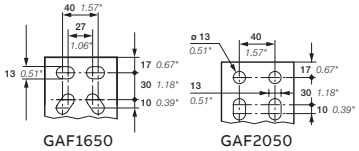
- main poles arc chutes fitted with permanent magnets specially designed for DC breaking. The connection polarities must be respected.
- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC), only 4 coils to cover control voltages between 48...500 V 50/60 Hz and 24...500 V DC
  - can manage large control voltage variations
  - reduced panel energy consumption
  - very distinct closing and opening
  - can withstand short voltage dips and voltage sags (SEMI F47 conditions of use on request).
- built-in surge suppression
- add-on auxiliary contact blocks for side mounting and a wide range of accessories.

IEC Rated operational current ≤ 55 °C 1000 V DC-1 A	UL / CSA General use rating ≤ 40 °C 1000 V A	Rated control circuit voltage Uc V 50/60 Hz	 V DC	Auxiliary contacts fitted 	Type	Order code	Weight Pkg (1 pce) kg
1040	1210	-	24...60	1 1	GAF1250-10-11	1SFL647025R6811	16.000
		48...130	48...130	1 1	GAF1250-10-11	1SFL647025R6911	16.000
		100...250	100...250	1 1	GAF1250-10-11	1SFL647025R7011	16.000
		250...500	250...500	1 1	GAF1250-10-11	1SFL647025R7111	16.000
1450	1650	100...250	100...250	1 1	GAF1650-10-11	1SFL677025R7011	35.000
1750	2050	100...250	100...250	1 1	GAF2050-10-11	1SFL707025R7011	35.000

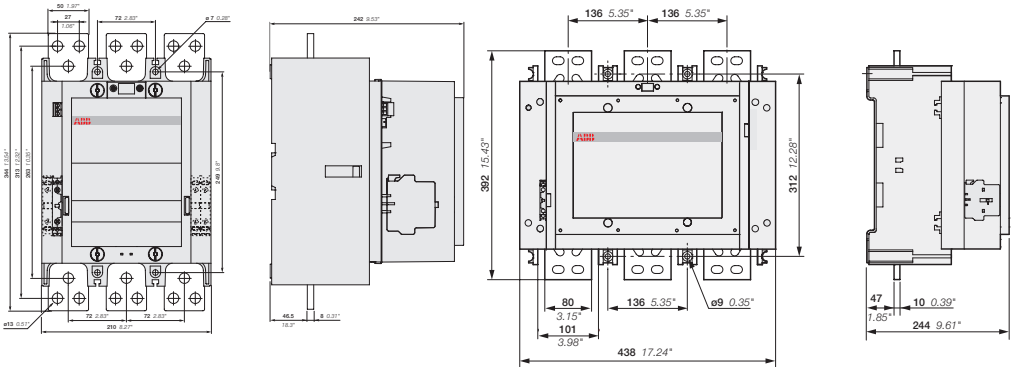
GAF1250 ... GAF2050 are equipped with low voltage inputs for control, for example by a PLC

Control inputs





GAF1650 GAF2050



GAF1250 GAF1650, GAF2050

Main dimensions mm, inches

GA75 ... GAF2050 contactors
Technical data

Main pole - Utilization characteristics according to IEC

Contactor types	AC operated	GA75							
	DC operated	GAE75							
	AC / DC operated		GAF185	GAF300	GAF460	GAF750	GAF1250	GAF1650	GAF2050
Standards		IEC 60947-1 / 60947-4-1 and EN 60947-1 / 60947-4-1							
Rated operational voltage Ue max.		1000 V DC							
DC-1 Utilization category, L/R ≤ 1 ms									
For air temperature close to contactor									
Ie / Rated operational current DC-1									
θ ≤ 40 °C	220 V	120 A	275 A	500 A	700 A	1050 A	1250 A	1650 A	2050 A
	440 V	100 A	275 A	500 A	700 A	1050 A	1250 A	1650 A	2050 A
	600 V	75 A	275 A	500 A	700 A	1050 A	1250 A	1650 A	2050 A
	1000 V	35 A	275 A	500 A	700 A	1050 A	1250 A	1650 A	2050 A
θ ≤ 55 °C	220 V	100 A	250 A	400 A	600 A	875 A	1040 A	1450 A	1750 A
	440 V	100 A	250 A	400 A	600 A	875 A	1040 A	1450 A	1750 A
	600 V	75 A	250 A	400 A	600 A	875 A	1040 A	1450 A	1750 A
	1000 V	35 A	250 A	400 A	600 A	875 A	1040 A	1450 A	1750 A
θ ≤ 70 °C	220 V	85 A	180 A	325 A	480 A	720 A	875 A	1270 A	1500 A
	440 V	85 A	180 A	325 A	480 A	720 A	875 A	1270 A	1500 A
	600 V	75 A	180 A	325 A	480 A	720 A	875 A	1270 A	1500 A
	1000 V	35 A	180 A	325 A	480 A	720 A	875 A	1270 A	1500 A
With conductor cross-sectional area (3)		(1)	150 mm²	300 mm² (2)	2x 240 mm²	2x 50x8 mm²	2x 100x5 mm²	3x 100x5 mm²	4x 100x5 mm²
DC-3 Utilization category, L/R ≤ 2 ms									
Ie / Rated operational current DC-3									
θ ≤ 55 °C	220 V	100 A	-						
	440 V	85 A	-						
DC-5 Utilization category, L/R ≤ 7.5 ms									
Ie / Rated operational current DC-5									
θ ≤ 55 °C	220 V	85 A	-						
	440 V	35 A	-						
Maximum electrical switching frequency		300 cycles/h							

(1) Refer to IEC 60947-1, table 9.
(2) For currents up to 370 A, use 2 x LP300 kits.For higher currents, use 300 mm² conductors of minimum length 500 mm together with terminal extension/enlargement (LX300/LW300).
(3) To minimize terminal temperature for GAF185 ... GAF2050, length of connection should be at least 0.5 m per pole.

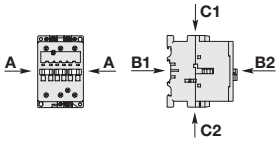
Main pole - Utilization characteristics according to UL / CSA

Contactor types	AC operated	GA75							
	DC operated	GAE75							
	AC / DC operated		GAF185	GAF300	GAF460	GAF750	GAF1250	GAF1650	GAF2050
Standards		UL 508, CSA C22.2 N°14		UL 60947-4-1, CSA C22.2 N°60947.4-1					
Maximum operational voltage		1000 V DC							
UL / CSA DC general use rating									
θ ≤ 40 °C	440 V	100 A	250 A	400 A	650 A	900 A	1210 A	1650 A	2050 A
	600 V	75 A	250 A	400 A	650 A	900 A	1210 A	1650 A	2050 A
	1000 V	35 A	250 A	400 A	650 A	900 A	1210 A	1650 A	2050 A
Maximum electrical switching frequency		300 cycles/h							

GA75 and GAE75 contactors

Technical data

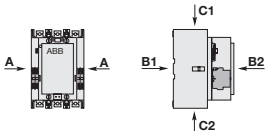
General technical data

Contactor types	AC operated	**GA75**
	DC operated	**GAE75**
Rated insulation voltage Ui		
acc. to IEC 60947-4-1		1000 V
acc. to UL		600 V
Rated impulse withstand voltage Uimp.		8 kV
Pollution degree		3
Ambient air temperature close to contactor		
Operation		-40...+70 °C
Storage		-60...+80 °C
Climatic withstand		acc. to IEC 60068-2-30 and 60068-2-11 - UTE C 63-100 specification II
Maximum operating altitude (without derating)		3000 m
Mechanical durability		
Number of operating cycles		10 millions operating cycles (5 millions for GAE75)
Max. switching frequency		3600 cycles/h
Shock withstand acc. to IEC 60068-2-27 and EN 60068-2-27 Mounting position 1		
	Shock direction	1/2 sinusoidal shock for 11 ms: no change in contact position, closed or open position
	A	20 g
	B1	10 g closed position / 5 g open position
	B2	15 g
	C1	20 g
	C2	20 g

GAF185 ... GAF2050 contactors

Technical data

General technical data

Contactor types	AC / DC operated	GAF185	GAF300	GAF460	GAF750	GAF1250	GAF1650	GAF2050
Rated insulation voltage Ui								
acc. to IEC 60947-4-1		1000 V						
acc. to UL		1000 V						
Rated impulse withstand voltage Uimp.		8 kV						
Pollution degree		3						
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)		3000 m						
Mechanical durability								
Number of operating cycles		5 millions operating cycles				0.5 millions	0.5 millions operating cycles	
Max. switching frequency		300 cycles/h					60 cycles/h	
Shock withstand acc. to IEC 60068-2-27 and EN 60068-2-27 Mounting position 1								
	Shock direction	1/2 sinusoidal shock for 30 ms: no change in contact position, closed or open position						
	A	5 g					-	
	B1	5 g					-	
	B2	5 g					-	
	C1	5 g					-	
	C2	5 g					-	

GA75 and GAE75 contactors

Technical data

Magnet system characteristics

Contactor types		AC operated	**GA75**
Coil operating limits		AC supply	At θ ≤ 55 °C 0.85...1.1 x Uc
acc. to IEC 60947-4-1			Please also refer to "Mounting characteristics and conditions for use"
AC control voltage			
Rated control circuit voltage Uc		at 50 Hz	24...690 V
		at 60 Hz	24...690 V
Coil consumption	Average pull-in value	50 Hz	180 VA
		60 Hz	210 VA
		50/60 Hz (1)	190 VA / 180 VA
	Average holding value	50 Hz	18 VA / 5.5 W
		60 Hz	18 VA / 5.5 W
		50/60 Hz (1)	18 VA / 5.5 W
Drop-out voltage			Approx. 40...65 % of Uc
Operating time			
Between coil energization and:		N.O. contact closing	8...27 ms
		N.C. contact opening	7...22 ms
Between coil de-energization and:		N.O. contact opening	4...11 ms
		N.C. contact closing	7...14 ms

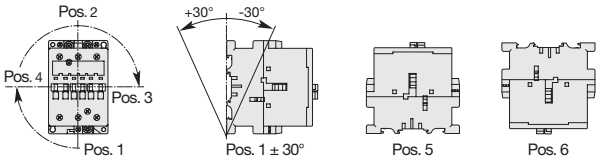
(1) 50/60 Hz coils: see "Voltage code table".

Magnet system characteristics

Contactor types	DC operated	**GAE75**
Coil operating limits	AC supply	At θ ≤ 55 °C 0.85...1.1 x Uc
acc. to IEC 60947-4-1		Please also refer to "Mounting characteristics and conditions for use"
DC control voltage		
Rated control circuit voltage Uc		12...250 V DC
Coil consumption	Average pull-in value	200 W
	Average holding value	4 W
Drop-out voltage		Approx. 15...40 % of Uc
Coil time constant		
Open	L/R	3 ms
Closed	L/R	15 ms
Operating time		
Between coil energization and:	N.O. contact closing	13...30 ms
	N.C. contact opening	10...27 ms
Between coil de-energization and:	N.O. contact opening (1)	5...15 ms
	N.C. contact closing (1)	8...18 ms

(1) The use of surge suppressors increases the opening time with a factor of 1.1 to 1.5 for a RV5 surge suppressor and a factor of 1.5 to 3 for RT5 surge suppressor.

Mounting characteristics and conditions for use

Contactor types		AC operated	**GA75**
		DC operated	**GAE75**
Mounting positions			
Control voltage / Ambient temperature			
Mounting positions	1, 1±30°, 2, 3, 4, 5	at θ ≤ 55 °C	0.85...1.1 x Uc
		at θ ≤ 70 °C	Uc
	6	at θ ≤ 55 °C	0.95...1.1 x Uc
		at θ ≤ 70 °C	Unauthorized
Mounting distances			The contactors can be assembled side by side
Fixing			
On rail according to IEC 60715, EN 60715			35 x 15 mm or 75 x 25 mm
By screws (not supplied)			2 x M6 screws placed diagonally

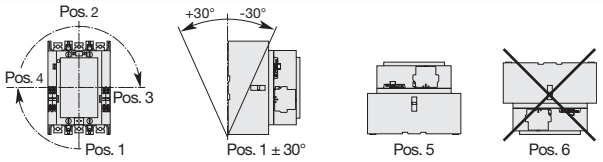
GAF185 ... GAF2050 contactors

Technical data

Magnet system characteristics

Contactor types	AC / DC operated	GAF185	GAF300	GAF460	GAF750	GAF1250	GAF1650	GAF2050
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. Please also refer to "Mounting characteristics and conditions for use"						
AC control voltage 50/60 Hz								
Rated control circuit voltage Uc		48...250 V AC		48...500 V AC			100...250 V AC	
Coil consumption	Average pull-in value	430 VA	470 VA	890 VA	850 VA		1900 VA	
	Average holding value	12 VA / 3.5 W	10 VA / 2.5 W	12 VA / 4 W	12 VA / 4.5 W		48 VA / 17 W	
DC control voltage								
Rated control circuit voltage Uc		20...250 V DC		24...500 V DC			100...250 V DC	
Coil consumption	Average pull-in value	500 W	520 W	990 W	950 W		1700 W	
	Average holding value	2 W		4 W	4.5 W		16 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:	N.O. contact closing	30...115 ms		50...120 ms			50...80 ms	
	N.C. contact opening	30...115 ms		50...120 ms			50...80 ms	
Between coil de-energization and:	N.O. contact opening	25...80 ms		33...70 ms			35...55 ms	
	N.C. contact closing	25...80 ms		33...70 ms			35...55 ms	
Control input for PLC's								
Between coil energization and:	N.O. contact closing	-		40...60 ms	40...90 ms		40...65 ms	
	N.C. contact opening	-		40...60 ms	40...90 ms		40...65 ms	
Between coil de-energization and:	N.O. contact opening	-		10...30 ms			10...30 ms	
	N.C. contact closing	-		10...30 ms			10...30 ms	

Mounting characteristics and conditions for use

Contactor types	AC / DC operated	GAF185	GAF300	GAF460	GAF750	GAF1250	GAF1650	GAF2050
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						
Mounting distances		The contactors can be assembled side by side						
Fixing								
On rail according to IEC 60715, EN 60715		–						
By screws (not supplied)		4 x M5			4 x M6		4 x M8	

GA75 and GAE75 contactors
Technical data

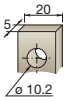
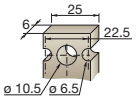
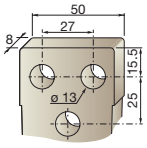
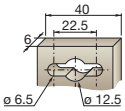
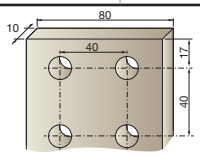
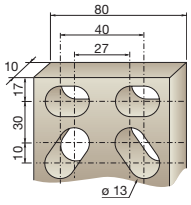
Connecting characteristics

Contactor types			AC operated	**GA75**
			DC operated	**GAE75**
Main terminals				 Screw terminals with single connector (13 x 10 mm)
Connection capacity (min. ... max.)				
Main conductors (poles)				
	Rigid	Solid (≤ 4 mm²)	1 x	6...50 mm²
		Stranded (≥ 6 mm²)	2 x	6...25 mm²
	Flexible with ferrule		1 x	6...35 mm²
			2 x	6...16 mm²
	Bars or lugs		L ≤	–
			I >	–
Connection capacity acc. to UL/CSA			1 or 2 x	AWG 8...1
Tightening torque		Recommended		4.00 Nm / 35 lb.in
		Max.		4.50 Nm
Auxiliary conductors (coil terminals)				
	Rigid solid		1 x	1...4 mm²
			2 x	1...4 mm²
	Flexible with ferrule		1 x	1...2.5 mm²
			2 x	0.75...2.5 mm²
	Lugs		L ≤	8 mm
			I >	3.7 mm
Connection capacity acc. to UL / CSA			1 or 2 x	AWG 18...14
Tightening torque				
Coil terminals		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				IP10
Coil terminals				IP20
Screw terminals				Delivered in open position, screws of unused terminals must be tightened
Main terminals				M6
Screwdriver type				Flat Ø 6.5 / Pozidriv 2
Coil terminals				M3.5
Screwdriver type				Flat Ø 5.5 / Pozidriv 2

GAF185 ... GAF2050 contactors

Technical data

Connecting characteristics

Contactor types			AC / DC operated	GAF185	GAF300	GAF460	GAF750 GAF1250	GAF1650 GAF2050
Main terminals Flat type							 GAF1250  GAF750	 GAF2050  GAF1650
Connection capacity (min. ... max.)								
Main conductors (poles)								
Rigid with connector	Single for Cu cable			6...185 mm²	16...240 mm²	240 mm²	300 mm²	–
	Single for Al/Cu cable			25...150 mm²	120...240 mm²	240 mm²	300 mm²	–
	Double for Al/Cu cable			–	2 x 95...120 mm²	2 x 240 mm²	3 x 185 mm²	–
Bars or lugs		L ≤		24 mm	32 mm	47 mm	52 mm	100 mm
		Ø >		8 mm	10 mm	10 mm	12 mm	12 mm
Connection capacity acc. to UL/CSA		1 or 2 x		6 - 250 MCM	4 - 500 MCM	2//250 - 500 MCM	3// 2/0 - 500 MCM	1/0 - 750 MCM
Tightening torque	Recommended			18 Nm / 160 lb.in	28 Nm / 247 lb.in	35 Nm / 310 lb.in	45 Nm / 398 lb.in	45 Nm / 398 lb.in
	Max.			20 Nm	30 Nm	40 Nm	49 Nm	49 Nm
Auxiliary conductors (coil terminals)								
Rigid Solid/Stranded		1 x		1...4 mm²				
		2 x		1...4 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				IP20				
Screw terminals								
Main terminals				M8	M10	M10	M12	
Coil terminals (delivered in open position)				Screws and bolts				
				M3.5				
			Screwdriver type	Flat Ø 5.5 mm / Pozidriv 2				