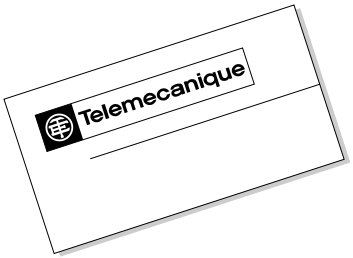
GV2 / GV3 Manual Starters and AK5 Panel Busbar System

File 2520



SQUARE D
GROUPE SCHNEIDER

Introduction

The GV manual starter and protector provides manual isolation, manual motor control, and overcurrent protection in one compact unit. Square D offers three different products that make up the GV product family - GV2M, GV2P, and GV3M. These devices are UL Listed as Manual Motor Controllers.

The GV2M is the basic starter designed to control motors with full load currents up to 32 A. The GV2P is a high performance starter that offers a high withstand rating and visible trip indication. The GV3M starter is used on large motors with full load currents up to 63 A.

The GV manual starters and protectors are also UL Listed for group installation applications. See page 5 for maximum fuse or circuit breaker ratings when used in group installations.

In many European applications, the GV devices are used as circuit breakers because they meet the requirements of IEC 947-2 for circuit breakers. However, the GV starter does not meet North American circuit breaker standards such as UL or CSA.

Standard Features

The GV family offers such standard features as:

- Class 10, ambient compensated overload relay
- Single phase sensitivity
- Instantaneous magnetic trip
- Test trip mechanism
- Provision for padlocking in the OFF position
- Fingersafe terminals
- Captive +/- screws with screw driver guide
- North American and European terminal markings

GV2M
0.1 to 32 A
Up to 20 hp @ 460 V
10 kA withstand @ 480 V
Push Button Operator

GV2P
0.1 to 25 A
Up to 15 hp @ 460 V
50 kA withstand @ 480 V
Rotary Handle Operator
Visible Trip Indication

GV3M
1 to 63 A
Up to 40 hp @ 460 V
50 kA withstand @ 480 V
Push Button Operator

Type of protection	Thermal-magnetic		
Mounting	● Clip-on mounting on 35 mm DIN rail. Unclips without using a tool. ● Panel mount with metal adapter plate.	● Clip-on mounting on 35 mm DIN rail. Unclips without using a tool. ● Panel mount directly.	● Clip-on mounting on 35 mm DIN rail. Unclips without using a tool. ● Panel mount directly.
Connection	Use a cross-head screwdriver; captive screws. Same screwdriver used for connections on GV2 starters and their add-on blocks.		
Marking	By marker holder supplied with each unit.		
Tripping test	By means of a fine-blade screwdriver on front face of product.		
Signalling on front face ● By the manual control device ● By mechanical flag indicator	● Of ON or OFF state	● Of ON or OFF state ● Of tripping by overload, short circuit, undervoltage or shunt trip. ● Of tripping by short circuit.	● Of ON or OFF state
Padlocking	In the OFF position, with padlock, using the system incorporated in the manual control device.		
Tamper-proof current dial	—	Of the thermal current setting dial, by transparent cover which can be sealed.	—
Accessories	Mounted on the front of the product: - Either N/C or N/O, N/O + N/O or N/O + N/C instantaneous contact blocks which do not increase the width of the product. Side-mounting, accessories snap onto the starters, without the use of tools. ● On the left-hand side, contact blocks which provide the following information: - N/O + N/O or N/O + N/C Start-Stop contacts, - N/O or N/C trip signalling contact, incorporating a mechanical flag indicator, and N/O or N/C Start-Stop contact, - C/O magnetic trip signalling contact, associated with a mechanical flag indicator, used for reset. ● On the right-hand side: - shunt trip or undervoltage trip.		
	- Combination block for use with K contactor. - Bus bars and connectors	- For GV2P, visible isolation block which mounts on the incoming terminals of the device - Door interlock mechanism.	

Thermal Setting (A)	Maximum Horsepower Ratings: Single Phase 115 V HP	Single Phase 230 V HP	Three Phase 200 V HP	Three Phase 230 V HP	Three Phase 460 V HP	Three Phase 575 V HP	**GV2M Pushbutton Catalog Number**	**GV2P Rotary Handle Catalog Number**	
0.11-0.16	–	–	–	–	–	–	GV2M01	GV2P01	See pages 6-11 for GV2 accessories and enclosures.
0.016-0.25	–	–	–	–	–	–	GV2M02	GV2P02	
0.25-0.40	–	–	–	–	–	–	GV2M03	GV2P03	
0.40-0.63	–	–	–	–	–	–	GV2M04	GV2P04	
0.63-1	–	–	–	–	1/2	1/2	GV2M05	GV2P05	
1-1.6	–	1/10	–	–	3/4	1	GV2M06	GV2P06	
1.6-2.5	–	1/6	1/2	1/2	1	1-1/2	GV2M07	GV2P07	
2.5-4	1/8	1/3	3/4	1	2	3	GV2M08	GV2P08	
4-6.3	1/4	1/2	1-1/2	1-1/2	3	5	GV2M10	GV2P10	
6-10	1/2	1-1/2	2	3	5	7-1/2	GV2M14	GV2P14	
9-14	3/4	2	3	3	10	10	GV2M16	GV2P16	
13-18	1	3	5	5	10	15	GV2M20	GV2P20	
17-23	1-1/2	3	5	7-1/2	15	20	GV2M21	GV2P21	
20-25	2	3	5	7-1/2	15	20	GV2M22	GV2P22	
24-32	2	5	10	10	20	30	GV2M32		
1-1.6	–	1/10	–	–	3/4	1	GV3M06		See page 28 for GV3 accessories and enclosures.
1.6-2.5	–	1/16	1/2	1/2	1	1-1/2	GV3M07		
2.5-4	1/8	1/3	3/4	1	2	3	GV3M08		
4-6	1/4	1/2	1-1/2	1-1/2	3	–	GV3M10		
6-10	1/2	1-1/2	2	3	5	7-1/2	GV3M14		
10-16	1	2	3	5	10	10	GV3M20		
16-25	2	3	5	7-1/2	15	20	GV3M25		
25-40	3	7-1/2	10	10	30	30	GV3M40		
40-63	5	10	20	20	40	60	GV3M63		

GV2M

GV2P

GV3M

File E164864
CCN NLRV

File LR 81630
Class 3211 05

Group Motor Installations

The GV2/GV3 devices are UL 508 listed, Manual Motor Controllers for use in group installations. If each motor in the grouping is controlled by a GV2/GV3 device, only one branch circuit protective device (circuit breaker or fusing) is necessary for the entire group per NEC 430-53c, provided that:

- The controller is UL listed for group installation
- The overload device is UL listed for group installation

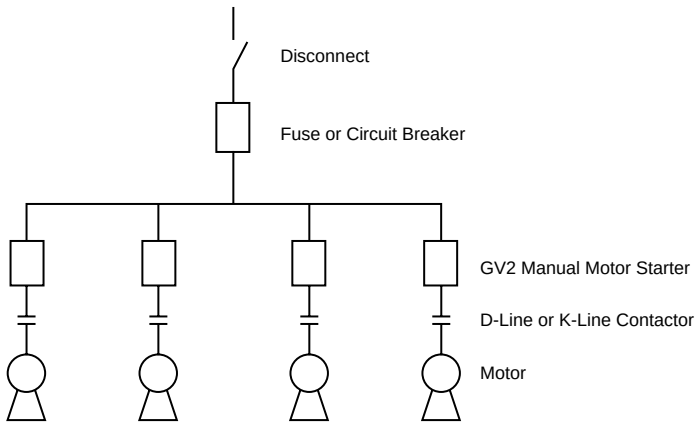
Refer to the table below to determine the maximum RMS short circuit current capacity for the GV2/GV3. The GV1L3 current limiter module may be used to increase the maximum RMS short circuit values for the GV2M14-M22.

The Maximum RMS short circuit current rating for the complete group installation is determined by the individual GV device with the lowest RMS short circuit value.

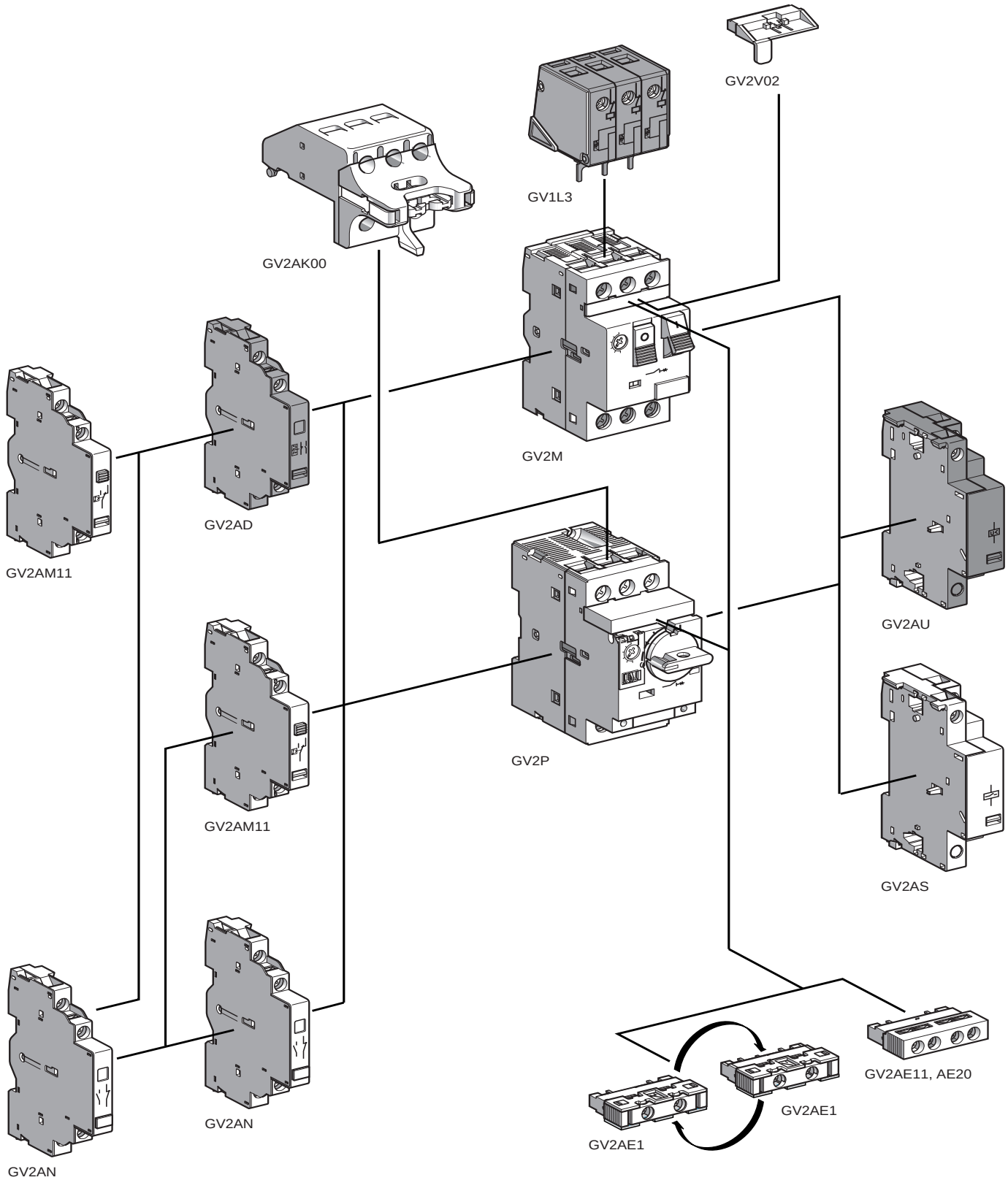
For example: a group installation uses a GV2M08, GV2M16 and GV2M22. The respective maximum RMS short circuit values @ 480 V, without the use of a GV1L3 current limiter module, are: 50 kA, 25 kA and 10 kA. Therefore, the group installation has a maximum RMS short circuit value of 10 kA.

Maximum RMS Short Circuit Current

Current Range	GV2	Max RMS, kA		w/GV11L3 Current Limiter		GV2	Max RMS, kA		GV3	Max RMS, kA	
		480 V	600 V	480 V	600 V		480 V	600 V		480 V	600 V
0.1-0.16	**M01**	50	30			**P01**	50	30			
0.16-0.25	**M02**	50	30			**P02**	50	30			
0.25-0.40	**M03**	50	30			**P03**	50	30			
0.40-0.63	**M04**	50	30			**P04**	50	30			
0.63-1.0	**M05**	50	30			**P05**	50	30			
1.0-1.6	**M06**	50	30			**P06**	50	30	**M06**	50	23
1.6-2.5	**M07**	50	30			**P07**	50	30	**M07**	50	23
2.5-4.0	**M08**	50	30			**P08**	50	30	**M08**	50	23
4.0-6.3	**M10**	50	30			**P10**	50	30	**M10**	50	23
6-10	**M14**	30	30	50		**P14**	50	30	**M14**	50	23
9-14	**M16**	25	10	50	30	**P16**	50	18			
10-16									**M20**	50	23
13-18	**M20**	25	10	50	30	**P20**	50	18			
16-25									**M25**	50	23
17-23	**M21**	10	10	50	30	**P21**	50	18			
20-25	**M22**	10	10	50	30	**P22**	50	18			
24-32	**M32**	10	10	50	30						
25-40									**M40**	50	10
40-63									**M63**	50	10



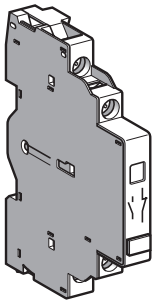
Typical Group Motor Installation



GV2AE11

Auxiliary contact blocks

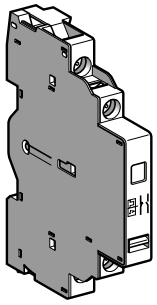
Description	Mounting Location	Max. No. of blocks	Contact Types	Sold in lots of	Catalog Number
Instantaneous auxiliary contacts	Front (3)	1	N/O OR N/C (1)	10	**GV2AE1**
			N/O + N/C	10	**GV2AE11**
			N/O + N/O	10	**GV2AE20**
	Left Hand Side	2	N/O + N/C	1	**GV2AN11**
			N/O + N/O	1	**GV2AN20**
Fault signalling contact + instantaneous auxiliary contact	Left Hand Side (2)	1	N/O (fault) + N/O	1	**GV2AD1010**
			N/O (fault) + N/C	1	**GV2AD1001**
			N/C (fault) + N/O	1	**GV2AD0110**
			N/C (fault) + N/C	1	**GV2AD0101**
Short circuit signalling contact	Left Hand Side	1	SPDT	1	**GV2AM11**



GV2AN11

Voltage trips

Description	Mounting Location	Max. No. of blocks	Voltage		Catalog Number
Undervoltage trip	Right Hand Side	1	110-115 V	50 Hz	**GV2AU115**
				60 Hz	**GV2AU116**
			220-240 V	50 Hz	**GV2AU225**
				60 Hz	**GV2AU226**
			380-400 V	50 Hz	**GV2AU385**
				60 Hz	**GV2AU386**
			415-440 V	50 Hz	**GV2AU415**
			440 V	60 Hz	**GV2AU385**
			500 V	50 Hz	**GV2AU505**
			600 V	60 Hz	**GV2AU505**
Shunt trip	Right Side Side	1	110-115 V	50 Hz	**GV2AS115**
				60 Hz	**GV2AS116**
			220-240 V	50 Hz	**GV2AS225**
				60 Hz	**GV2AS226**
			380-400 V	50 Hz	**GV2AS385**
				60 Hz	**GV2AS386**
			415-440 V	50 Hz	**GV2AS415**
			440 V	60 Hz	**GV2AS385**
			500 V	50 Hz	**GV2AS505**
			600 V	60 Hz	**GV2AS606**



GV2AD1010

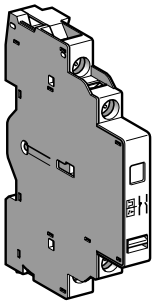
Add-on contact blocks

Description	Mounting Location	Max. No. of blocks	Sold in lots of	Catalog Number
Visible isolation block, 3-pole on incoming side of GV2P	Front (3)	1	1	**GV2AK00**
100 kA limiter	Top	1	1	**GV1L3**

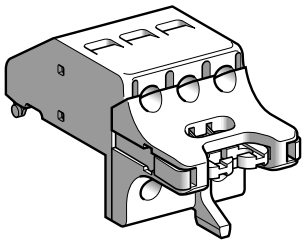
Sealing kit

For GV2M	Front	–	10	**GV2V02**

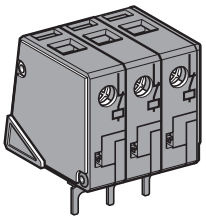
(1) Choice of N/C or N/O contact operation depending on which way the reversible block is mounted.
(2) The **GV2AD** is always mounted next to the manual starter.
(3) Can mount either a **GV2AE** contact block or a **GV2AK00** visible isolation block on **GV2P**.



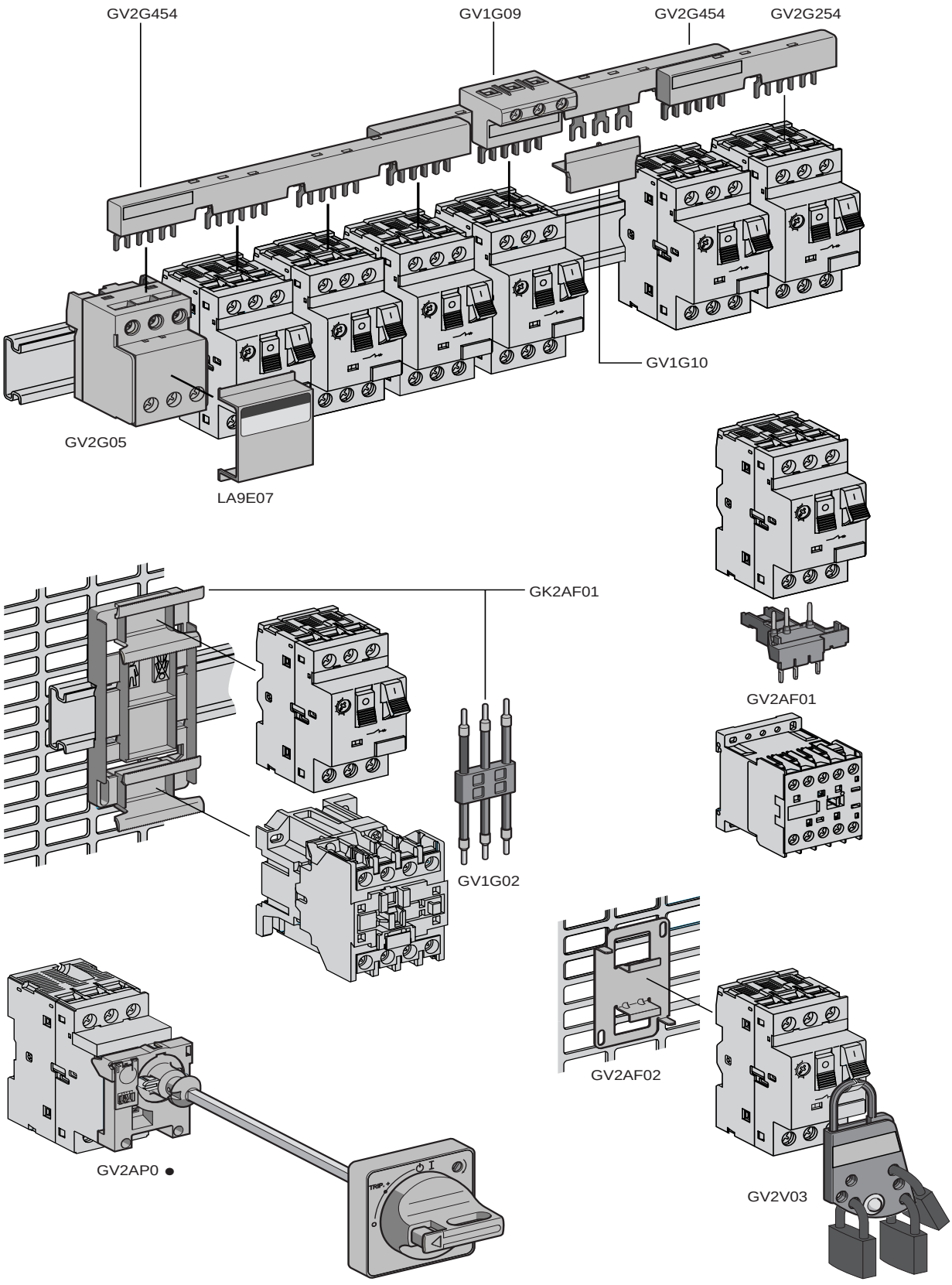
GV2AU

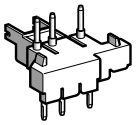


GV2AK00

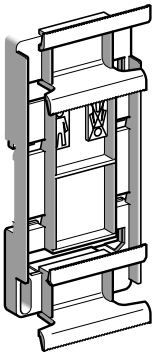


GV1L3

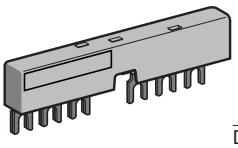




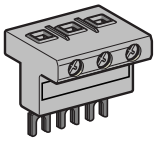
GV2AF01



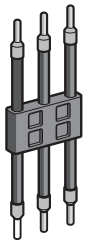
GK2AF01



GV2G254



GV1G09



GV1G02

Mounting accessories

Description	Application	Sold in lots of	Catalog Number
Motor starter adaptor plate	With 3-pole connection for mounting of a GV2 and an LC1 D09 to D25 contactor	1	**GK2AF01**
Adaptor plate	For screw mounting of a GV2M	10	**GV2AF02**
7.5 mm height compensation plate	To allow GV2M and GV2P to be mounted on a common busbar	10	**GV1F03**
Combination block	Between GV2M and LC1K or LP1K contactor	10	**GV2AF01**

Wiring accessories

Description	Number of GVs to be mounted	Number of Side Mounted Auxiliary Blocks on each GV starter	Busbar Pitch (mm)	Sold in lots of	Catalog Number
Sets of 3-pole, 63 A busbars	2	none	45	1	**GV2G245**
		1 GV2AN, AM, AD	54	1	**GV2G254**
		1 or 2 GV2AN, AM, AD; or 1 GV2AS, AU	72	1	**GV2G272**
	3	1 GV2AN, AM, AD	54	1	**GV2G354**
	4	None	45	1	**GV2G445**
		1 GV2AN, AM, AD	54	1	**GV2G454**
		1 or 2 GV2AN, AM, AD; or 1 GV2AS, AU	72	1	**GV2G472**
	5	1 GV2AN, AM, AD	54	1	**GV2G554**

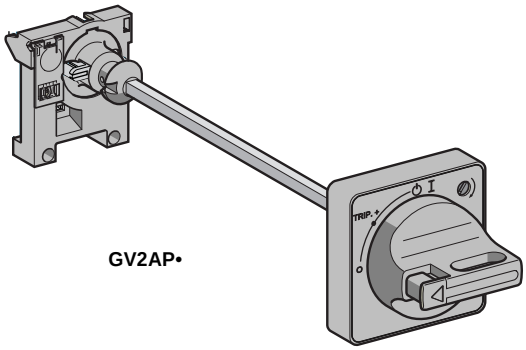
Description	Application		Sold in lots of	Catalog Number
Protective end cover	For unused busbar outlets	5		**GV1G10**
Terminal blocks for supply to one or more GV2G0• busbar sets	Connection from the top		1	**GV1G09**
	Connection from bottom can be fitted with a GV1L3 current limiter		1	**GV2G05**
Cover for terminal block	For mounting in modular panels		10	**LA9E07**
Flexible 3-pole connector	For connecting a GV2 to an LC1D09 to D25 contactor (AC coil)	Distance between mounting rails 3.9-4.7 in 100-120 mm	10	**GV1G02**
Flexible 3-pole connector	For connecting a GV2 to a LP1D09 to D25 contactor (DC coil)		10	**GV1REQ3369**
Clip-in marker holders (supplied with each motor starter)	For GV2M (0.31 x 0.67 in) (8 x 17 mm)		100	**LA9D90**
	For GV2P (0.31 x 0.87 in) (8 x 22 mm)		100	**LA9D92**

Padlockable external operator

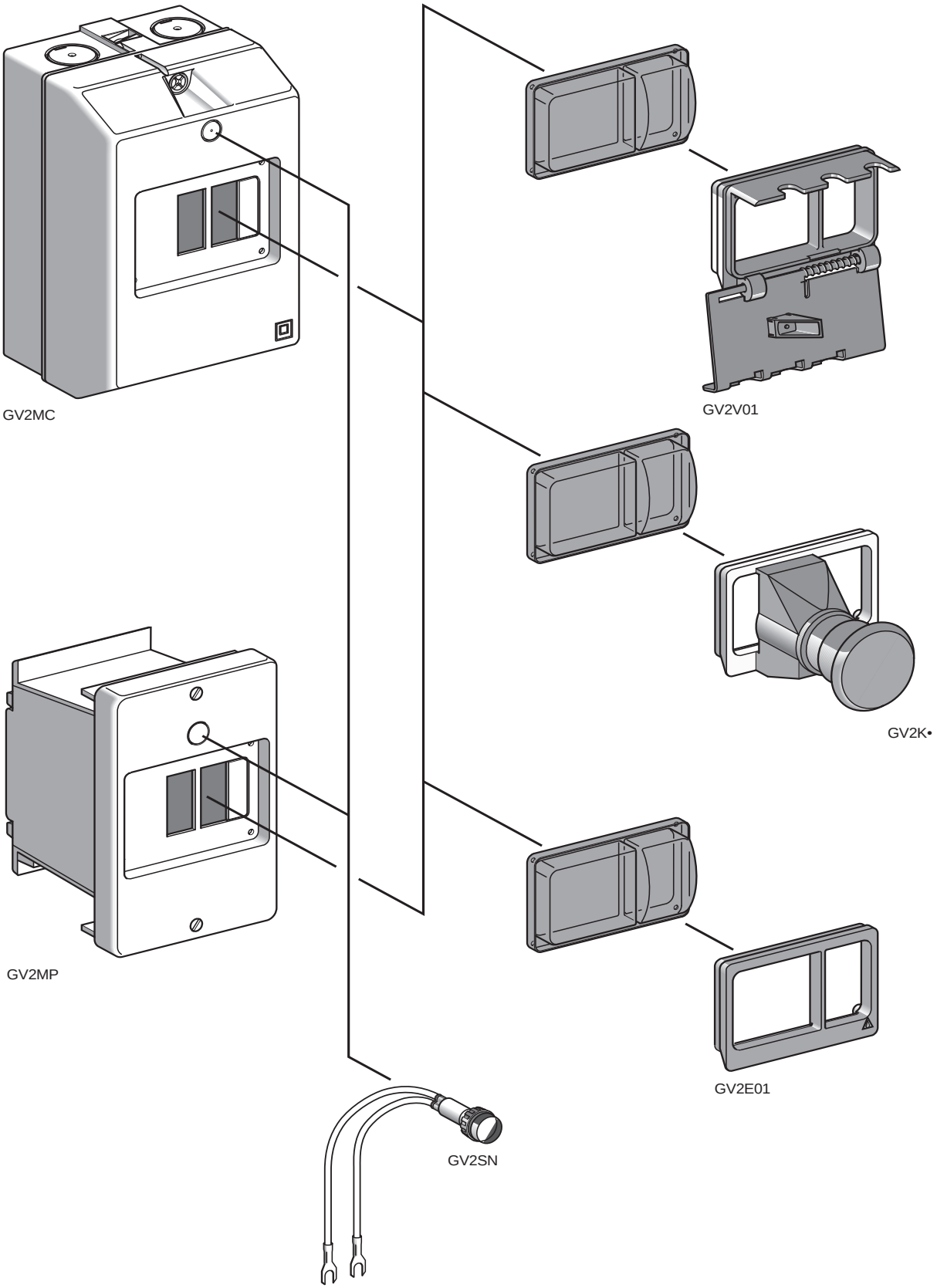
Description		Catalog Number
For GV2P (6.0 to 11.4 in) (150 to 290 mm)	Black handle, blue legend plate	**GV2AP01**
	Red handle, yellow legend plate	**GV2AP02**

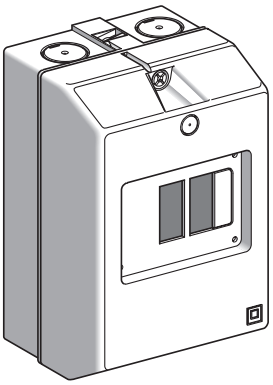
Padlocking device

For all GV2 devices	6 padlocks, Ø 6 mm shank max. (padlock not supplied)	**GV2V03**



GV2AP•

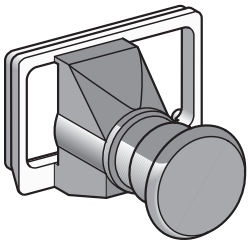




GV2MC•

GV2M enclosures

Application	Type	Degree of protection of enclosure	Catalog Number
For GV2M manual starters	Surface	IP 41	**GV2MC01**
and protectors with or without accessories (maximum of 1 accessory on right and left for GV2MC and GV2MP01 or MP02, 1 accessory only on right for GV2MP03 and GV2MP04)	mounting, double insulated with protective cover.	IP 55	**GV2MC02**
	Sealable cover.	IP 55 for temperature < + 5 °C	**GV2MC03**
	Flush mounting with protective cover.	IP 41 (full size)	**GV2MP01**
		IP 41 (reduced size)	**GV2MP03**
		IP 55 (full size)	**GV2MP02**
		IP 55 (reduced size)	**GV2MP04**



GV2K•

Front plate

Application		Degree of protection of enclosure	Sold in lots of	Catalog Number
Padlocking device (1) for GV2M operator (padlocking is only possible in the"O" position)			1	**GV2V01**
Mushroom head "stop" pushbutton (1) **Ø 40 mm, red**	Spring return		1	**GV2K011**
	Latching	Key release (key #455)	1	**GV2K021**
		Turn to release	1	**GV2K031**
	Latching/Padlockable	Turn to release	1	**GV2K04**
Sealing kit	For enclosures and front plate	IP 55	10	**GV2E01**
		IP 55 for temperature < + 5 °C	10	**GV2E02**
Neutral link			10	**GV2N01**

Description	Voltage	Color	Sold in lots of	Catalog Number
	V			
Neon indicator light	110	Green	10	**GV2SN13**
		Red	10	**GV2SN14**
		Orange	10	**GV2SN15**
		Clear	10	**GV2SN17**
	220/240	Green	10	**GV2SN23**
		Red	10	**GV2SN24**
		Orange	10	**GV2SN25**
		Clear	10	**GV2SN27**
	380/440	Green	10	**GV2SN33**
		Red	10	**GV2SN34**
		Orange	10	**GV2SN35**
		Clear	10	**GV2SN37**

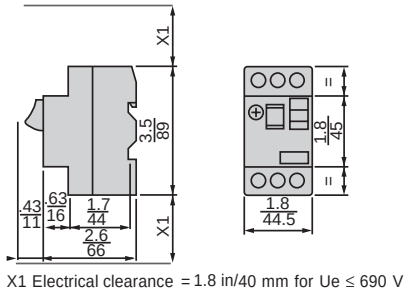
(1) Supplied with IP 55 sealing kit.

GV2SN•

Mounting Dimensions

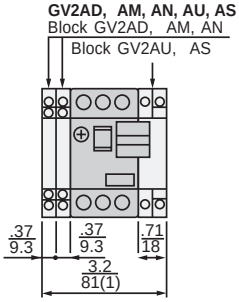
Dimensions **Inches** / MM

GV2M

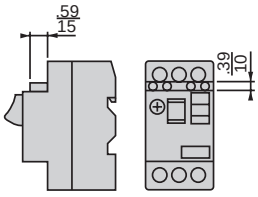


X1 Electrical clearance = 1.8 in/40 mm for Ue ≤ 690 V

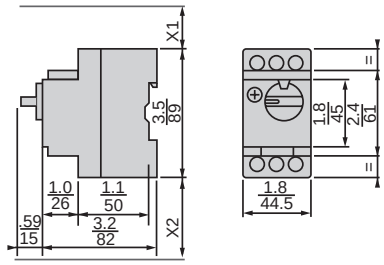
GV2AD, AM, AN, AU, AS
Block GV2AD, AM, AN
Block GV2AU, AS



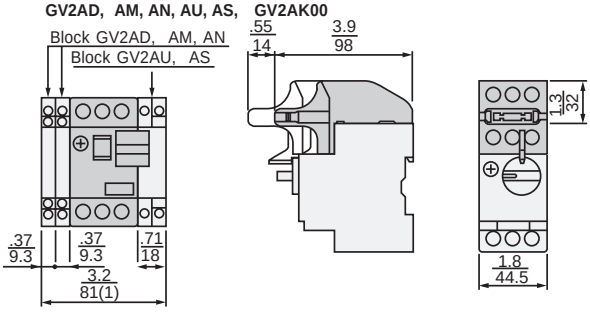
GV2AE



GV2P

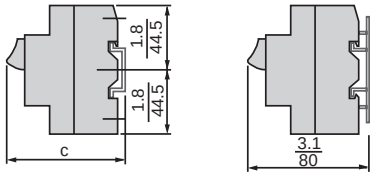


GV2AD, AM, AN, AU, AS, **GV2AK00**
Block GV2AD, AM, AN
Block GV2AU, AS

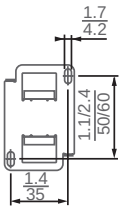


X2 = 1.8 in/40 mm
X1 Electrical clearance = 1.8 in/ 40 mm for Ue ≤ 415 V, or 3.2 in/ 80 mm for Ue = 440 V, or 4.7 in/120 mm for Ue = 500 and 690 V

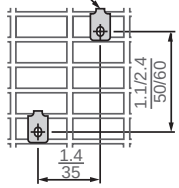
Mounting of GV2M
On 1.4 in/ 35 mm (rail)
C = 78.5 on AM1DP200 (35 x 7.5)
C = 86 on AM1DE200, ED200 (35 x 15)



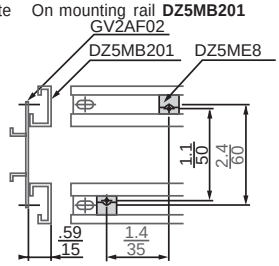
On panel with adaptor plate **GV2AF02**



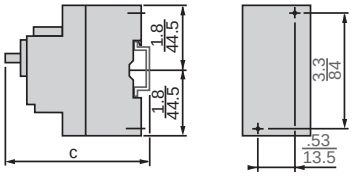
On pre-slotted mounting plate **AM1PA**
AF1EA4



On mounting rail **DZ5MB201**

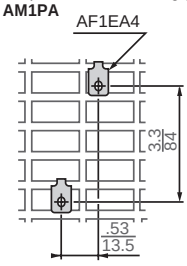


Mounting of GV2P
On 1.4 in/ 35 mm (rail)
C = 98.5 on AM1DP200 (35 x 7.5)
C = 106 on AM1DE200, ED200 (35 x 15)

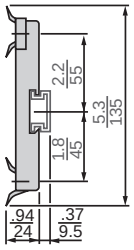


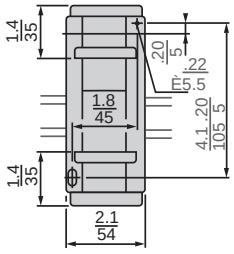
On panel

On pre-slotted mounting plate **AM1PA**
AF1EA4

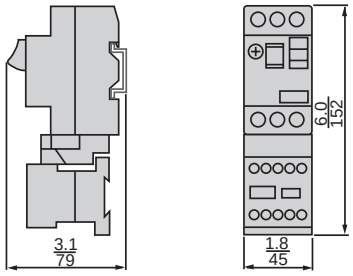


Adaptor plate **GK2AF01**

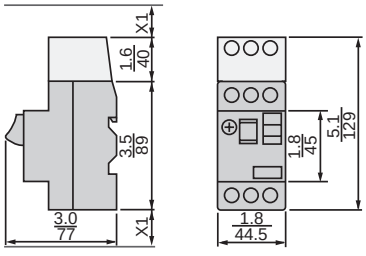




GV2AF01
GV2M + K contactor combination

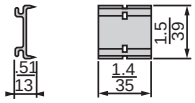


GV2M + GV1L3 (current limiter)



X1 = .40 in/ 10 mm for Ue = 230 V or 1.2 in/ 30 mm for 230 V < Ue ≤ 690 V

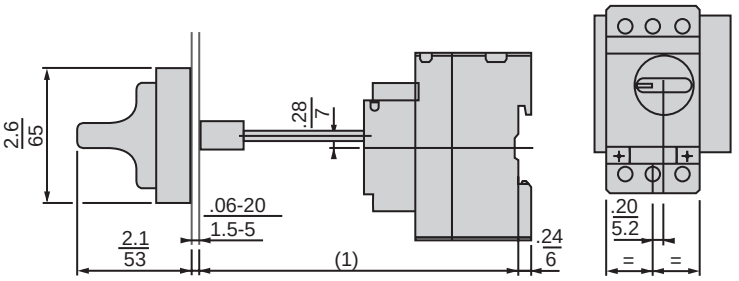
7.5 mm height compensation plate
GV1F03



Mounting Dimensions

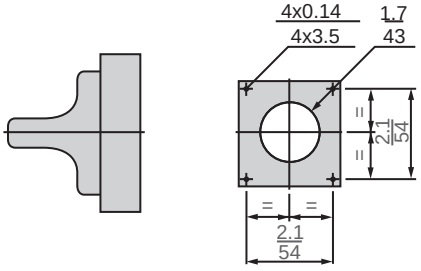
Dimensions **Inches** MM

Mounting of external operator GV2AP01 or GV2AP02

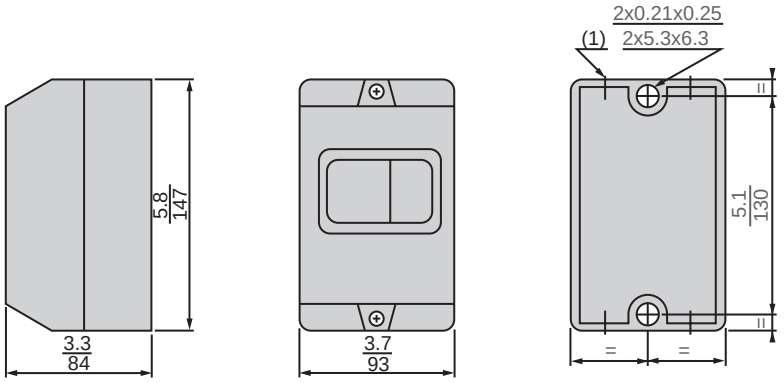


(1) 135mm min, 284mm max with operating rod uncut, 88 with operating rod cut.

Door cut-out

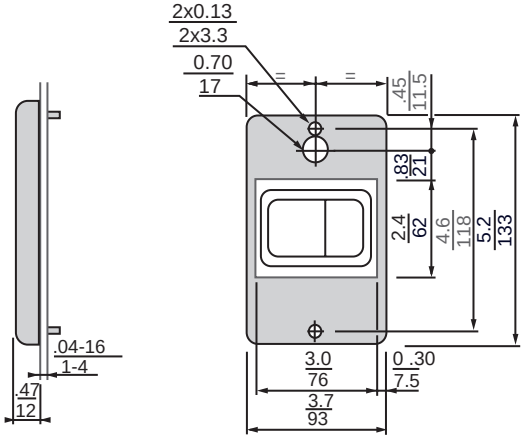


Surface mounting enclosure GV2MC0•



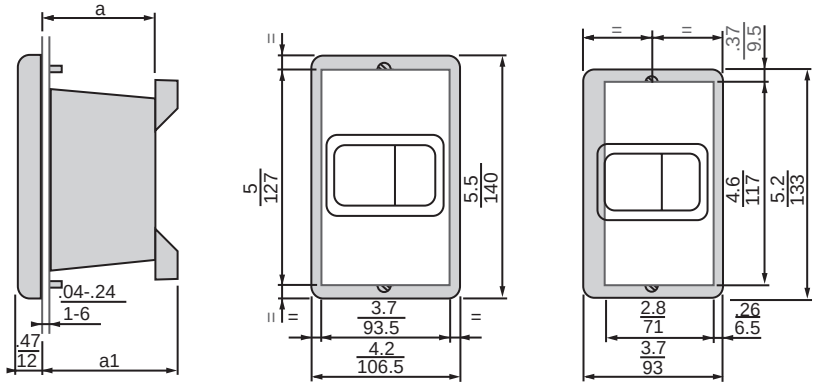
(1) 4 knock-outs for .63 in/ 16 mm plastic cable glands or n° 16 conduit

Front plate GV2CP21



Flush mounting enclosure GV2MP0• (bracket cut-out dimensions)

GV2MP0• **GV2MP01, MP02** **GV2MP03, MP04**

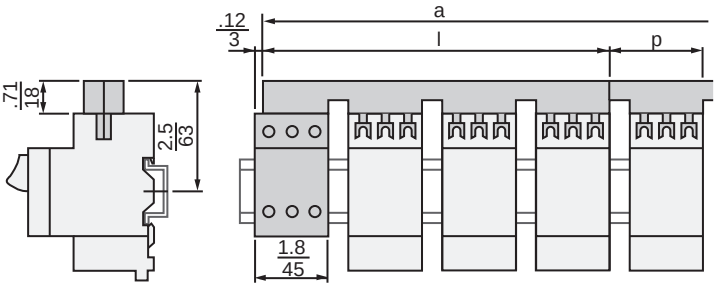


GV2	a	a1
MP01, MP02	2.8 in(71 mm)	–
MP03, MP04	2.8 in(71 mm)	3.4 in(86 mm)

Mounting Dimensions

Dimensions **Inches** / MM

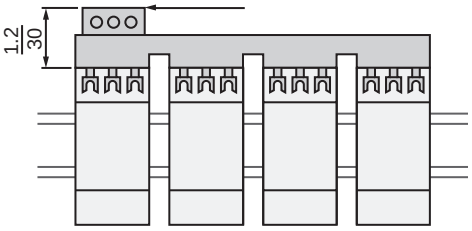
Sets of busbars GV2G445, GV2G454, GV2G472 with terminal block **GV2G05**



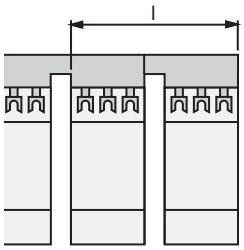
	l	p
GV2G454 (0.16 x 2.1 in/4 x 54 mm)	8.1 in(206 mm)	2.1 in(54 mm)
GV2G445 (0.16 x 1.8 in/4 x 45 mm)	7.0 in(179 mm)	1.8 in(45 mm)
GV2G472 (0.16 x 1.8 in/4 x 45 mm)	10.2 in(260 mm)	2.8 in(72 mm)

	a			
No. of taps	5	6	7	8
GV2G454	10.2 in(260 mm)	12.4 in(314 mm)	14.5 in(368 mm)	16.6 in(422 mm)
GV2G445	8.8 in(224 mm)	10.6 in(269 mm)	12.4 in(314 mm)	14.1 in(359 mm)
GV2G472	13.1 in(332 mm)	15.9 in(404 mm)	18.7 in(476 mm)	21.6 in(548 mm)

Sets of busbars
with terminal block **GV1G09**

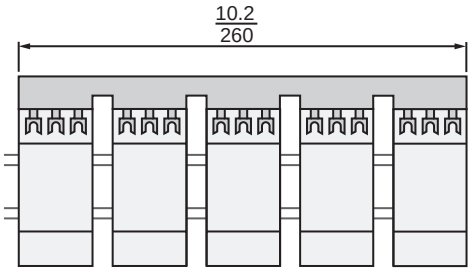


Sets of busbars GV2G245, GV2G254, GV2G272

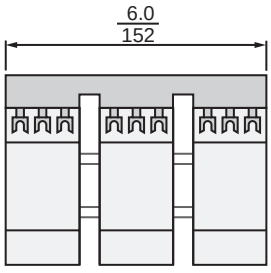


	l
GV2G254 (0.08 x 2.1 in/2 x 54 mm)	3.9 in(98 mm)
GV2G245 (0.08 x 1.8 in/2 x 45 mm)	3.5 in(89 mm)
GV2G272 (0.08 x 2.8 in/2 x 72 mm)	4.6 in(116 mm)

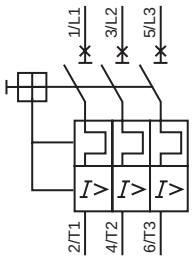
Set of busbars GV2G554



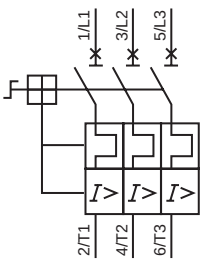
Set of busbars GV2G354



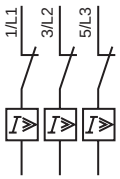
GV2M



GV2P

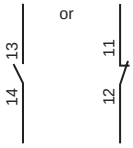


Current limiter GV1L3

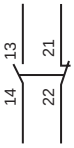


Front mounting add-on contact blocks
Instantaneous auxiliary contacts

GV2AE1



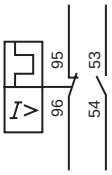
GV2AE11



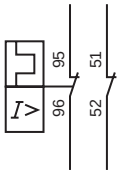
GV2AE20

Side mounting add-on contact blocks
Instantaneous auxiliary contacts and fault signalling contacts

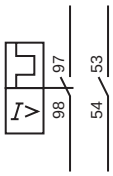
GV2AD0110



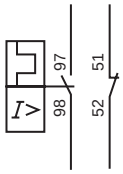
GV2AD0101



GV2AD1010

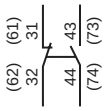


GV2AD1001

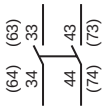


Instantaneous auxiliary contacts

GV2AN11

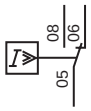


GV2AN20



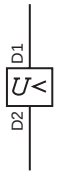
Short-circuit signalling contacts

GV2AM11

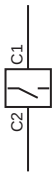


Voltage trips

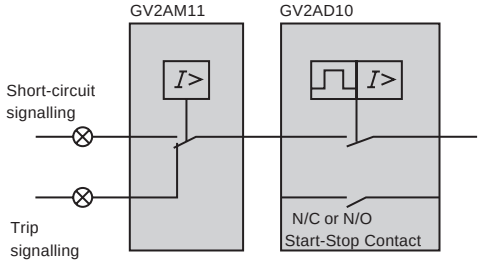
GV2AU



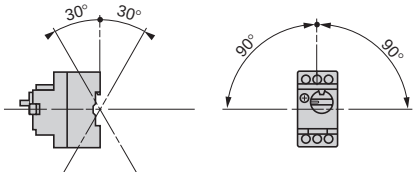
GV2AS



Use of fault signalling contact and short-circuit signalling contact



Environment

Type		**GV2M**		**GV2P**	
Conforming to standards		IEC 947-1, 947-2, 947-4-1, EN 60204, BS 4752, BS 4941, UL 508, CSA C22.2 No. 14, NF C 63-650, NF C 63-120, 79-130, VDE 0113, 0660.			
Product approvals		DEMKO, NEMKO, SEMKO, CSA. UL, BV, GL, LROS, DNV, PTB		CSA, UL, PTB	
UL File Number		File E164864, CCN NLRV			
CSA File Number		File LR 81630, Class 3211 05			
Protective treatment		Pending: CEBEC, ECU, KEMA-KEUR. MEEI, ÖVE "TH"		Pending : ECU, ÖVE "TH"	
Degree of protection conforming to IEC 529		In enclosure **GV2M01**: IP 41 – In enclosure **GV2M02**: IP 55		– –	
Shock resistance conforming to IEC 68-2-27		30 g		30 g	
Vibration resistance conforming to IEC 68-2-6		5 g (5 to 150 Hz)		5 g (5 to 150 Hz)	
Ambient air temperature - storage		-40 to +176 °F(-40 to + 80 °C)		-40 to +176 °F(-40 to + 80 °C)	
- operation		-4 to +140 °F(-20 to + 60 °C)		-4 to +140 °F(-20 to + 60 °C)	
Temperature compensation		-4 to +140 °F(-20 to + 60 °C)		-4 to +140 °F(-20 to + 60 °C)	
Flame resistance conforming to IEC 695-2-1		1760 °F(960 °C)		1760 °F(960 °C)	
Maximum operating altitude		6562 ft(2000 m)		6562 ft(2000 m)	
Operating positions in relation to normal vertical mounting position					
Wiring Number of conductors and cross sectional area (c.s.a.)		Max	Min	Max	Min
Solid cable		2-#8 AWG(2-6 mm^2)	2-#16 AWG(2-1 mm^2)	2-#8 AWG(2-6 mm^2)	2-#16 AWG(2-1 mm^2)
Flexible cable without cable end		2-#8 AWG(2-6 mm^2)	2-#14 AWG(2-1.5 mm^2)	2-#8 AWG(2-6 mm^2)	2-#14 AWG(2-1.5 mm^2)
Flexible cable with cable end		2-#10 AWG(2-4 mm^2)	2-#16 AWG(2-1 mm^2)	2-#10 AWG(2-4 mm^2)	2-#16 AWG(2-1 mm^2)
Suitable for isolation conforming to IEC 947-1 § 7-1-6		Yes		Yes	
Tightening torque		15 lb-in(1.7 N•m)		15 lb-in(1.7 N•m)	
Resistance to mechanical impact		0.5 J		0.5 J	
		Enclosed : 6		–	
Sensitivity to phase failure		Yes, conforming to IEC 947-4-1, paragraph 7-2-1-5-2			

Characteristics

Type		GV2M	GV2P
Utilization category conforming to IEC 947-2		A	A
conforming to IEC 947-4-1		AC-3	AC-3
Rated operational voltage (Ue) conforming to IEC 947-2	**V**	690	690
Rated insulation voltage (Ui) conforming to IEC 947-2	**V**	690	690
conforming to CSA C22.2 No. 14 and UL 508	**V**	600	600
Rated operational frequency conforming to IEC 947-2	**Hz**	50/60	50/60
Rated impulse withstand voltage (U imp) conforming to IEC 947-2	**kV**	6	6
Total power dissipated per pole	**W**	2.5	2.5
Mechanical life (ops : closing, opening)	**ops**	100 000	100 000
Electrical life for AC-3 duty	**ops**	100 000	100 000
Duty class (maximum operating rate)	**ops/h**	25	25
Rated duty conforming to IEC 947-4-1		Continuous duty	Continuous duty

Characteristics

Type		GV2AU	GV2AS
Rated insulation voltage (Ui) conforming to IEC 947-1	**V**	690	690
Operational voltage conforming to IEC 947-1	**V**	0.85-1.1 Ue	0.7-1.1 Ue
Drop-out voltage	**V**	0.35-0.7 Ue	0.2-0.75 Ue
Inrush consumption	**VA**	12	14
	W	8	10.5
Sealed consumption	**VA**	3.5	5
	W	1.1	1.6
Operating time conforming to IEC 947-1	**msec**	From the moment the voltage reaches its operational value until opening of the GV2 10-15	
On-load factor		100 %	
Wiring Number of conductors and cross sectional area (c.s.a.)		Min	Max
Solid cable		1-#16 to #12 AWG(1-2.5 mm^2)	2-#16 to #12 AWG(1-2.5 mm^2)
Flexible cable without cable end		1-#18 to #12 AWG(0.75-2.5 mm^2)	2-#18 to #12 AWG(0.75-2.5 mm^2)
Flexible cable with cable end		1-#18 to #14 AWG(0.75-1.5 mm^2)	2-#18 to #14 AWG(0.75-1.5 mm^2)
Tightening torque		12 lb-in(1.4 N•m) max	
Mechanical life (ops: closing-opening)	**ops**	100 000	

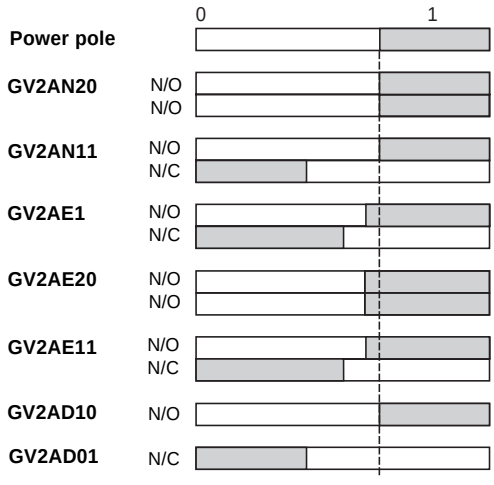
Type		Instantaneous auxiliary contacts **GV2AN, GV2AD**							Fault signalling contacts **GV2AD, GV2 AM11**			
Rated insulation voltage (Ui) (associated insulation coordination) conforming to IEC 947-1	**V**	690							690			
to CSA C22.2 No. 14 and UL 508	**V**	600							300			
Conventional rated thermal current (Ith) conforming to IEC 947-5-1	**A**	6							2.5			
to CSA C22.2 No. 14 and UL 508	**A**	5							1			
Mechanical life (ops: closing-opening)	**ops**	100 000							1000			
Operational power and current conforming to IEC 947-5-1 a.c. operation		AC-15/100 000 ops							AC-14/1000 ops			
Rated operational voltage (Ue)	**V**	48	110 127	230 240	380 415	440	500	690	24	48	110 127	230 240
Operational power, normal conditions	**VA**	300	500	720	850	650	500	400	36	48	72	72
Occasional breaking and making capacities, abnormal conditions	**VA**	3000	7000	13 000	15 000	13 000	12 000	9000	220	300	450	450
Rated operational current (Ie)	**A**	6	4.5	3.3	2.2	1.5	1	0.6	1.5	1	0.5	0.3
Operational power and current conforming to IEC 947-5-1 d.c. operation		DC-13/100 000 ops							DC-13/1000 ops			
Rated operational voltage (Ue)	**V**	24	48	60	110	240 (1)	–	–	24	48	60	–
Operational power, normal conditions	**W**	140	240	180	140	120	–	–	24	15	9	–
Occasional breaking and making capacities, abnormal conditions	**W**	240	360	240	210	180	–	–	100	50	50	–
Rated operational current (Ie)	**A**	6	5	3	1.3	0.5	–	–	1	0.3	0.15	–
Minimum operational conditions d.c. operation	**V**	17										
	mA	5										
Short circuit protection		By **GB2CB●●** circuit breaker (rating according to operational current for Ue ≤ 415 V) or by gl fuse 10 A max										

Wiring		Min	Max
Number of conductors and cross sectional area (c.s.a.) Solid cable		1-#16 to #12 AWG(1-2.5 mm^2)	2-#16 to #12 AWG(1-2.5 mm^2)
Flexible cable without cable end		1-#18 to #12 AWG(0.75-2.5 mm^2)	2-#18 to #12 AWG(0.75-2.5 mm^2)
Flexible cable with cable end		1-#18 to #14 AWG(0.75-1.5 mm^2)	2-#18 to #14 AWG(0.75-1.5 mm^2)
Tightening torque	**N•m/lb-in**	12 lb-in(1.4 N•m) max	

(1) Add an RC circuit type LA4 D to the load terminals, see Square D Digest.

Type		Instantaneous auxiliary contacts **GV2AE**			
Rated insulation voltage (Ui) (associated insulation coordination) conforming to IEC 947-1	**V**	250 (690 with respect to main circuit)			
to CSA C22.2 No. 14 and UL 508	**V**	300			
Conventional rated thermal current (Ith) conforming to IEC 947-5-1	**A**	2.5			
to CSA C22.2 No. 14 and UL 508	**A**	1			
Mechanical life	**ops**	100 000			
Operational power and current to IEC 947-5-1. a.c. operation		AC-15/100 000 ops (closing / opening)			
Rated operational voltage (Ue)	**V**	24	48	110 127	230 240
Operational power, normal conditions	**VA**	48	60	120	120
Occasional breaking and making capacities, abnormal conditions	**VA**	480	600	1270	2400
Rated operational current (Ie)	**A**	2	1.25	1	0.5
Operational power and current to IEC 947-5-1. d.c. operation		DC-13/100 000 ops (closing / opening)			
Rated operational voltage (Ue)	**V**	24	48	60	–
Operational power, normal conditions	**W**	24	15	9	–
Occasional breaking and making capacities, abnormal conditions	**W**	100	50	50	–
Rated operational current (Ie)	**A**	1	0.3	0.15	–
Low level switching contact reliability		Number of faults for “n” million operating cycles (17 V-5 mA): = 10^{-6}			
Short circuit protection		By **GB2CB06** circuit breaker or gl fuse, 10 A max			
Wiring Number of conductors and cross sectional area		Min		Max	
Solid cable		1-#16 to #12 AWG(1-2.5 mm^2)		2-#16 to #12 AWG(1-2.5 mm^2)	
Flexible cable without cable end		1-#18 to #12 AWG(0.75-2.5 mm^2)		2-#18 to #12 AWG(0.75-2.5 mm^2)	
Flexible cable with cable end		1-#18 to #14 AWG(0.75-1.5 mm^2)		2-#18 to #14 AWG(0.75-1.5 mm^2)	
Tightening torque		12 lb-in(1.4 N•m) max			

Contact operation
instantaneous auxiliary contacts



Contact open

Contact closed

Operation of fault signalling contacts

GV2AM11
Change of state following tripping on short circuit.

GV2AD10 and AD01
Change of state following tripping on short circuit, overload or undervoltage.

3-pole busbars GV1G0• and GV2G0•

Rated insulation voltage (Ui)	Conforming to IEC 947-1	**V**	690
Conventional rated thermal current (Ith)	Conforming to IEC 439-1	**A**	63
Permissible peak current (I peak)		**kA**	11
Permissible thermal limit (I^2t)		**kA^2s**	104
Degree of protection	Conforming to IEC 529		IP 20

Terminal blocks GV2G05 and GV1G09

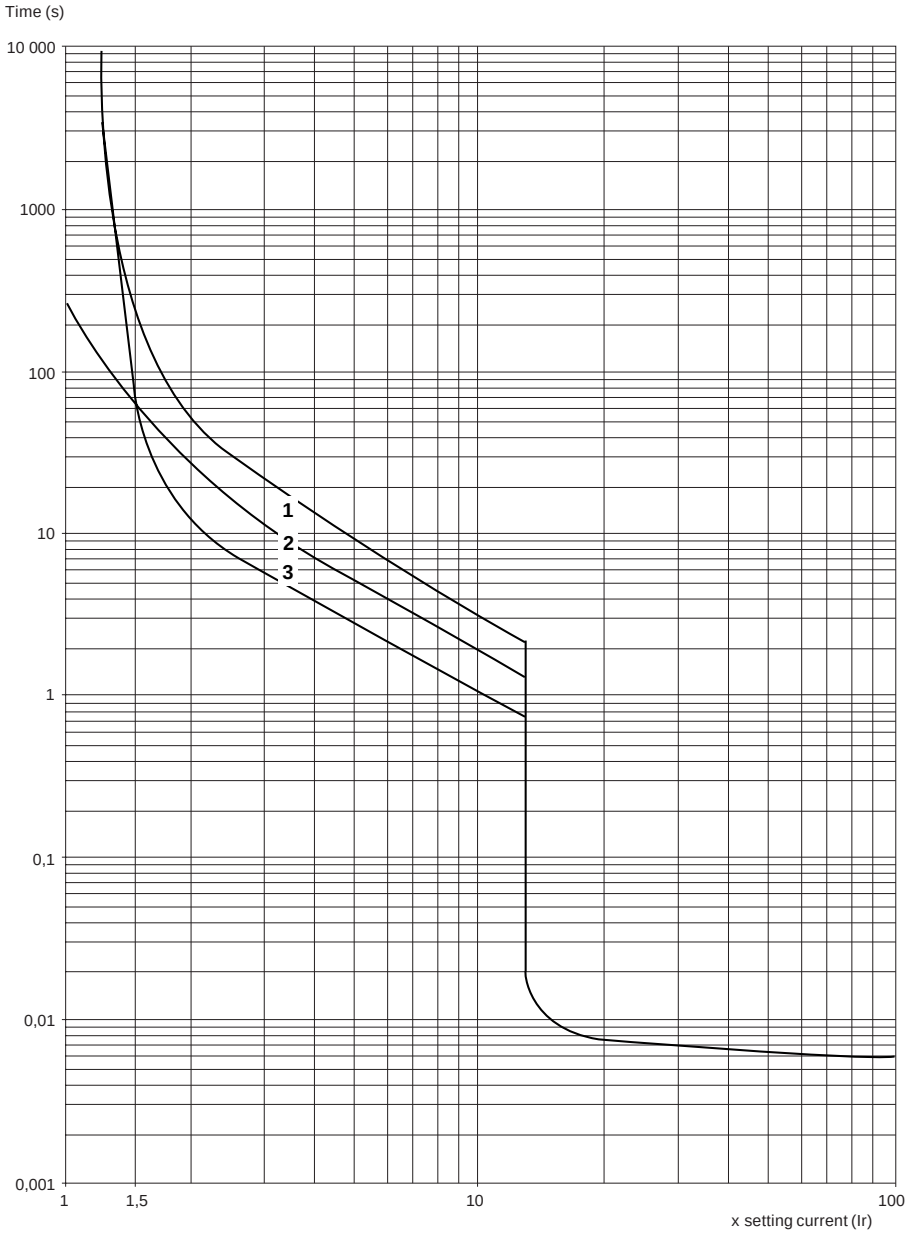
Rated insulation voltage (Ui)	Conforming to IEC 947-1	**V**	690
Conventional rated thermal current (Ith)	Conforming to IEC 439-1	**A**	63
Degree of protection	Conforming to IEC 529		IP 20
Wiring	Solid cable		1-#14 to #2 AWG(1.5 to 25 mm^2) conductor or 2-#14 to #6 AWG(1.5 to 10 mm^2) conductors
	Flexible cable without cable end		1-#14 to #2 AWG(1.5 to 25 mm^2) conductor or 2-#12 to #6 AWG(2.5 to 10 mm^2) conductors
	Flexible cable with cable end		1-#14 to #4 AWG(1.5 to 16 mm^2) conductor or 2-#14 to #10 AWG(1.5 to 4 mm^2) conductors
Tightening torque	Connector		20 lb-in(2.2 N•m)
	Screw clamp		15 lb-in(1.7 N•m)

Current limiter GV1L3

Rated insulation voltage (Ui)	Conforming to IEC 947-1	**V**	690
Conventional rated thermal current (Ith)	Conforming to IEC 947-1	**A**	63
Operating threshold	rms current	**A**	1500 (non adjustable threshold)
Wiring	Solid cable		1-#14 to #2 AWG(1.5 to 25 mm^2) conductor or 2-#14 to #6 AWG(1.5 to 10 mm^2) conductors
	Flexible cable without cable end		1-#14 to #2 AWG(1.5 to 25 mm^2) conductor or 2-#12 to #6 AWG(2.5 to 10 mm^2) conductors
	Flexible cable with cable end		1-#14 to #4 AWG(1.5 to 16 mm^2) conductor or 2-#14 to #10 AWG(1.5 to 4 mm^2) conductors
Tightening torque			20 lb-in(2.2 N•m)

Thermal-magnetic tripping curves for GV2M and GV2P

Average operating time at 20°C according to multiples of the setting current

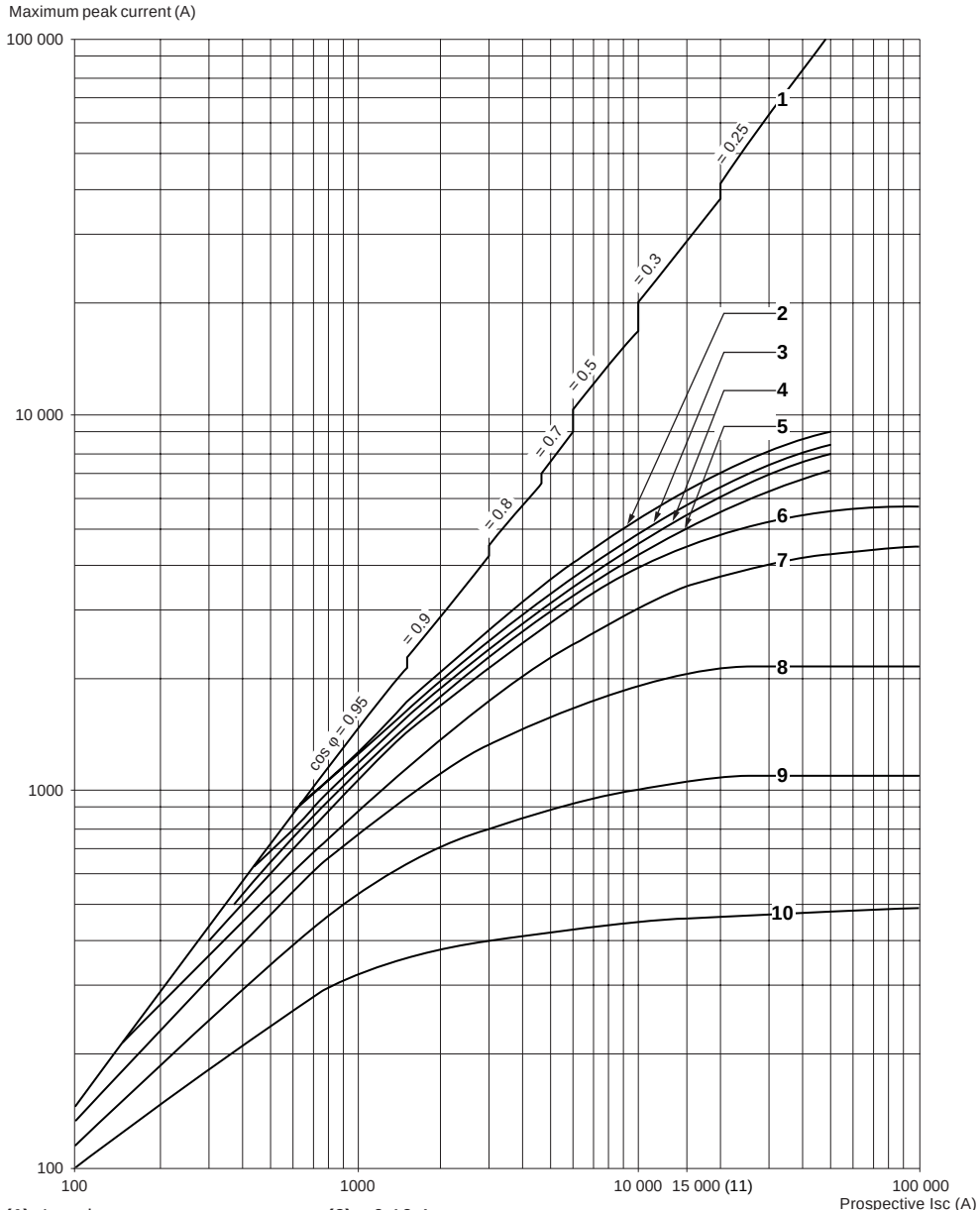


1 3 poles from cold state
2 2 poles from cold state
3 3 poles from hot state

Current limitation on short circuit

For GV2M and GV2P
Three-phase 400/415 V

Dynamic stress
I peak = f (prospective Isc) at 1.05 Ue = 435 V

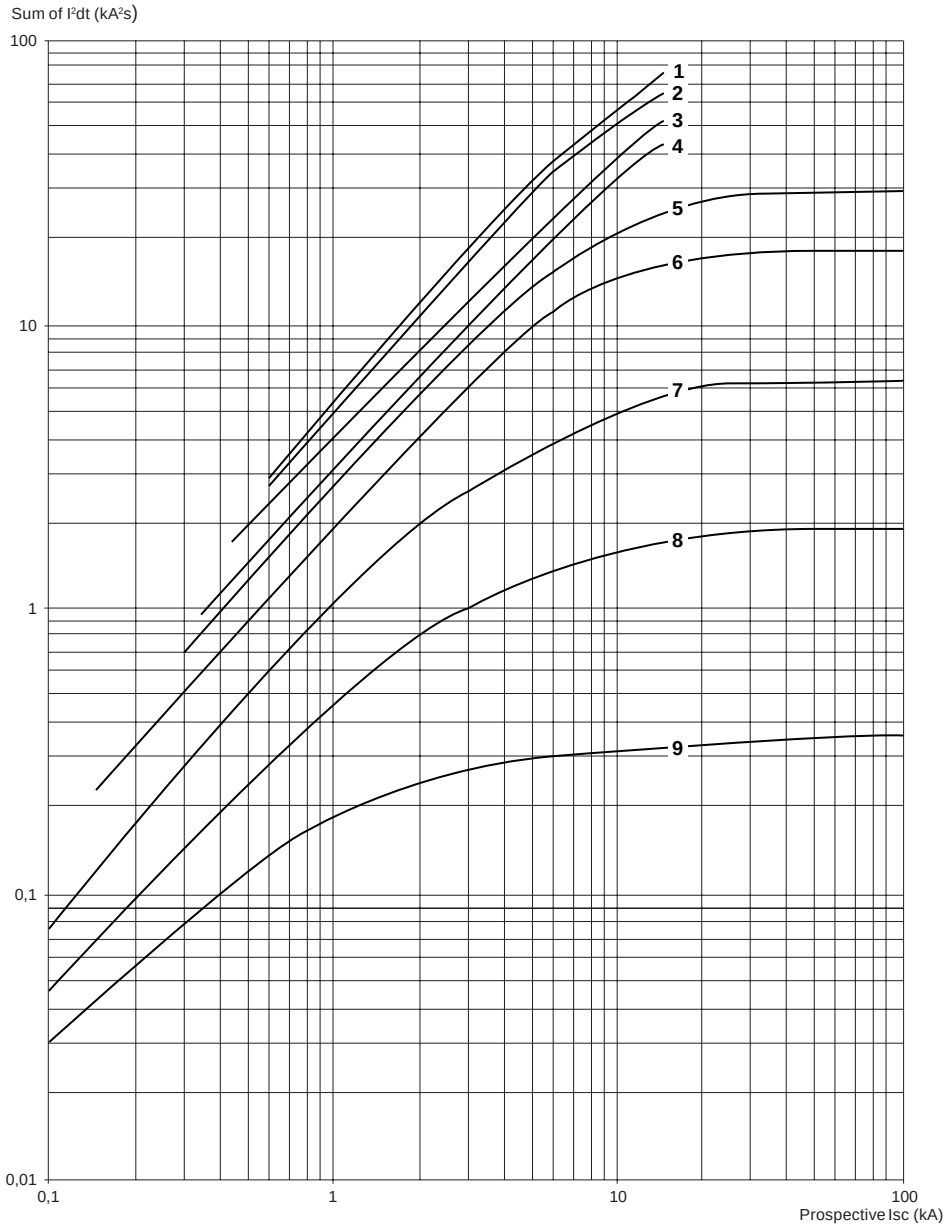


(1) I peak max.
(2) 20-25 A
(3) 17-23 A
(4) 13-18 A
(5) 9-14 A
(6) 6-10 A
(7) 4-6.3 A
(8) 2.5-4 A
(9) 1.6-2.5 A
(10) 1-1.6 A
(11) Limit of rated ultimate breaking capacity on short circuit of GV2M (14, 18, 23 and 25 Amp ratings)

Thermal limit on short circuit for GV2M

Thermal limit in kA² s in the magnetic operating zone

Sum of I²dt = f (prospective Isc) at 1.05 Ue = 435 V

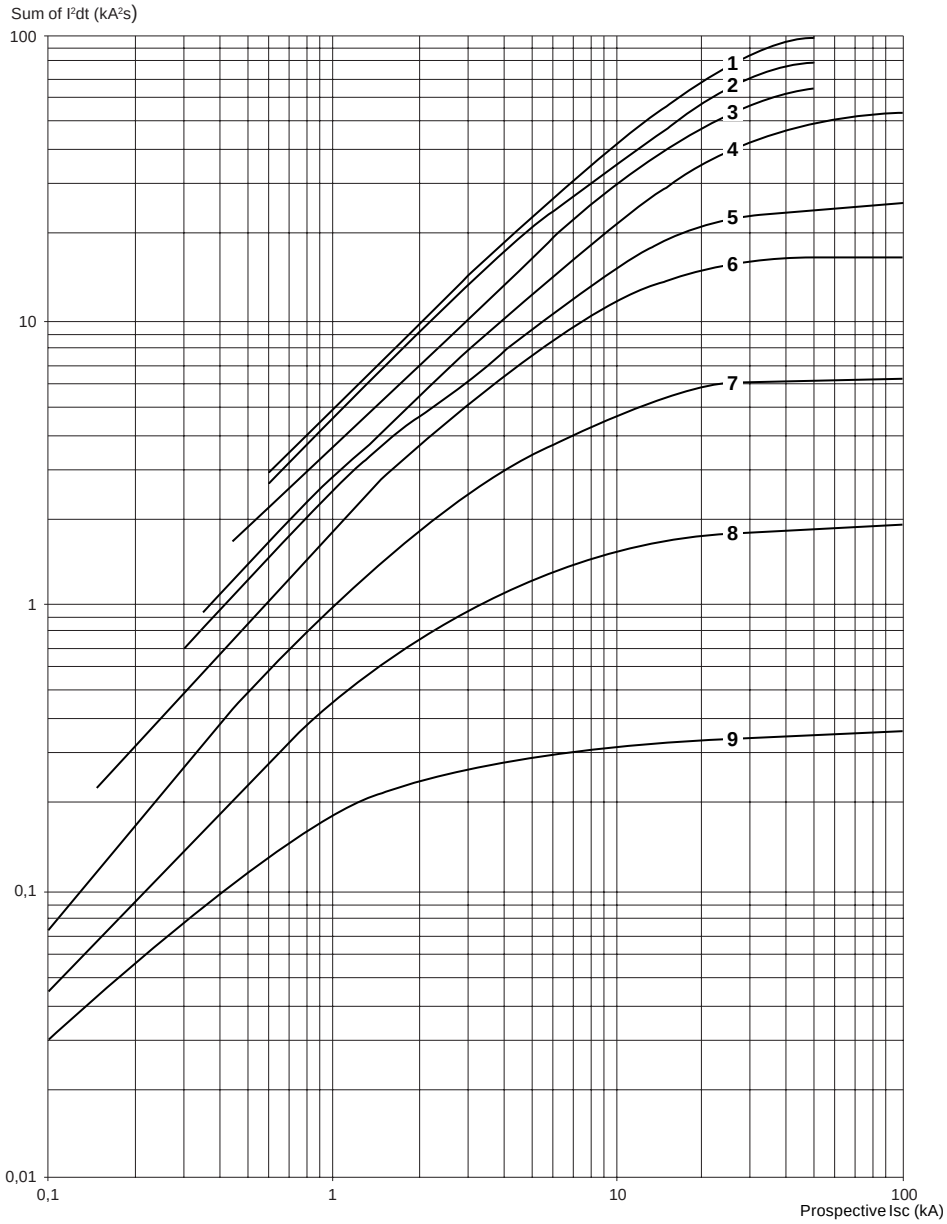


1 20-25 A
2 17-23 A
3 13-18 A
4 9-14 A
5 6-10 A
6 4-6,3 A
7 2.5-4 A
8 1.6-2.5 A
9 1-1.6 A

Thermal limit on short circuit for GV2P

Thermal limit in kA²s in the magnetic operating zone

Sum of I^2dt = f (prospective Isc) at 1.05 Ue = 435 V



1 20-25 A
2 17-23 A
3 13-18 A
4 9-14 A
5 6-10 A
6 4-6.3 A
7 2.5-4 A
8 1.6-2.5 A
9 1-1.6 A

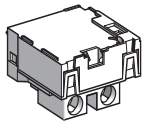
Type				GV2									GV2								
				M01 to M06	M07	M08	M10	M14	M16	M20	M21	M22	P01 to P06	P07	P08	P10	P14	P16	P20	P21	P22
Rating			**A**	**0.1 to 1.6**	**2.5**	**4**	**6.3**	**10**	**14**	**18**	**23**	**25**	**0.1 to 1.6**	**2.5**	**4**	**6.3**	**10**	**14**	**18**	**23**	**25**
Breaking capacity conforms to IEC 947-2	230/ 240 V	Icu	**kA**	♦	♦	♦	♦	♦	♦	♦	50	50	♦	♦	♦	♦	♦	♦	♦	♦	♦
		Ics % (1)		♦	♦	♦	♦	♦	♦	♦	100	100	♦	♦	♦	♦	♦	♦	♦	♦	♦
	400/ 415 V	Icu	**kA**	♦	♦	♦	♦	♦	15	15	15	15	♦	♦	♦	♦	♦	♦	50	50	50
		Ics % (1)		♦	♦	♦	♦	♦	50	50	40	40	♦	♦	♦	♦	♦	♦	50	50	50
	440 V	Icu	**kA**	♦	♦	♦	50	15	8	8	6	6	♦	♦	♦	♦	♦	50	20	20	20
		Ics % (1)		♦	♦	♦	100	100	50	50	50	50	♦	♦	♦	♦	♦	75	75	75	75
	500 V	Icu	**kA**	♦	♦	♦	50	10	6	6	4	4	♦	♦	♦	♦	50	42	10	10	10
		Ics % (1)		♦	♦	♦	100	100	75	75	75	75	♦	♦	♦	♦	100	75	75	75	75
	690 V	Icu	**kA**	♦	3	3	3	3	3	3	3	3	♦	8	8	6	6	6	4	4	4
		Ics % (1)		♦	75	75	75	75	75	75	75	75	♦	100	100	100	100	100	100	100	100
Associated fuses (if required) if Isc > breaking capacity Icu conforms to IEC 947-2	230/ 240 V	aM	**A**	♦	♦	♦	♦	♦	♦	♦	80	80	♦	♦	♦	♦	♦	♦	♦	♦	♦
		gl	**A**	♦	♦	♦	♦	♦	♦	♦	100	100	♦	♦	♦	♦	♦	♦	♦	♦	♦
	400/ 415 V	aM	**A**	♦	♦	♦	♦	♦	63	63	80	80	♦	♦	♦	♦	♦	♦	100	100	100
		gl	**A**	♦	♦	♦	♦	♦	80	80	100	100	♦	♦	♦	♦	♦	♦	125	125	125
	440 V	aM	**A**	♦	♦	♦	50	50	50	50	63	63	♦	♦	♦	♦	♦	50	63	80	80
		gl	**A**	♦	♦	♦	63	63	63	63	80	80	♦	♦	♦	♦	♦	63	80	100	100
	500 V	aM	**A**	♦	♦	♦	50	50	50	50	50	50	♦	♦	♦	♦	50	50	50	50	50
		gl	**A**	♦	♦	♦	63	63	63	63	63	63	♦	♦	♦	♦	63	63	63	63	63
	690 V	aM	**A**	♦	16	25	32	32	40	40	40	40	♦	20	25	40	40	50	50	50	50
		gl	**A**	♦	20	32	40	40	50	50	50	50	♦	25	32	50	50	63	63	63	63

♦ > 100 kA.
(1) As % of Icu.

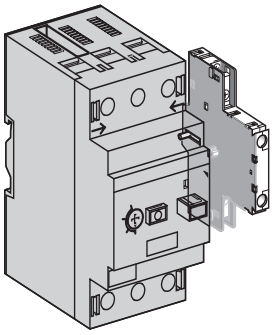
Used in association with current limiter GV1L3

Type				**GV2**								
				M01 to M06	**M07**	**M08**	**M10**	**M14**	**M16**	**M20**	**M21**	**M22**
Rating			**A**	**0.1 to 1.6**	**2.5**	**4**	**6.3**	**10**	**14**	**18**	**23**	**25**
Breaking capacity conforms to IEC 947-2	230/ 240 V	Icu	**kA**	♦	♦	♦	♦	♦	♦	♦	♦	♦
		Ics % (1)		♦	♦	♦	♦	♦	♦	♦	♦	♦
	400/ 415 V	Icu	**kA**	♦	♦	♦	♦	♦	100	100	100	100
		Ics % (1)		♦	♦	♦	♦	♦	50	50	40	40
	440 V	Icu	**kA**	♦	♦	♦	♦	♦	50	20	20	20
		Ics % (1)		♦	♦	♦	♦	♦	75	75	75	75
	500 V	Icu	**kA**	♦	♦	♦	♦	50	42	10	10	10
		Ics % (1)		♦	♦	♦	♦	100	100	75	75	75
Type				**GV2**								
				P01 to P06	**P07**	**P08**	**P10**	**P14**	**P16**	**P20**	**P21**	**P22**
Rating			**A**	**0.1 to 1.6**	**2.5**	**4**	**6.3**	**10**	**14**	**18**	**23**	**25**
Breaking capacity conforms to IEC 947-2	230/ 240 V	Icu	**kA**	♦	♦	♦	♦	♦	♦	♦	♦	♦
		Ics % (1)		♦	♦	♦	♦	♦	♦	♦	♦	♦
	400/ 415 V	Icu	**kA**	♦	♦	♦	♦	♦	♦	♦	♦	♦
		Ics % (1)		♦	♦	♦	♦	♦	♦	♦	♦	♦
	440 V	Icu	**kA**	♦	♦	♦	♦	♦	100	100	100	100
		Ics % (1)		♦	♦	♦	♦	♦	50	50	50	50
	500 V	Icu	**kA**	♦	♦	♦	♦	100	100	100	100	100
		Ics % (1)		♦	♦	♦	♦	50	50	50	50	50
Type				**GV2**								
				M01 to M06	**M07**	**M08**	**M10**	**M14**	**M16**	**M20**	**M21**	**M22**
Rating			**A**	**0.1 to 1.6**	**2.5**	**4**	**6.3**	**10**	**14**	**18**	**23**	**25**
Cable protection against thermal stress in the event of short circuit (PVC insulated copper cables) Minimum cross sectional area (c.s.a.) protected to 40 °C at Isc max		0.04 in² 1 mm²		(3)	(3)	(3)	≤10kA	≤6kA	(2)	(2)	(2)	(2)
		0.06 in² 1.5 mm²		(3)	(3)	(3)	≤20kA	≤10kA	(2)	(2)	(2)	(2)
		0.10-0.24 in 2.5-6 mm		(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)

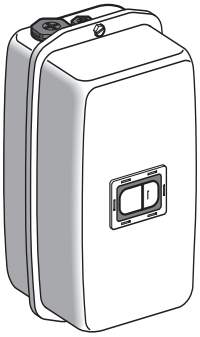
♦ > 100 kA. (1) As % of Icu. (2) Cable c.s.a. not protected (3) cable c.s.a. protected.



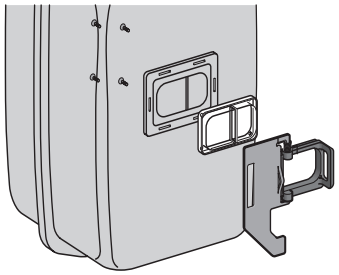
GV3B



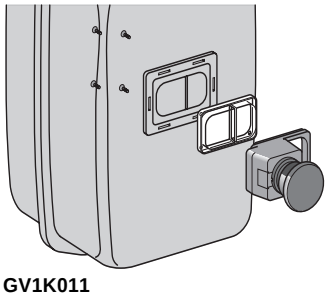
GV1A01



GV3CE01



GV1V01



GV1K011

Description	Characteristics		Sold in lots of	Catalog Number
Voltage trips (1) (internal mount)	Under-voltage trips	110, 120, 127 V 50 Hz 120, 127 V 60 Hz	1	**GV3B11**
		220, 240 V 50 Hz 240, 277 V 60 Hz	1	**GV3B22**
		380, 415 V 50 Hz 480 V 60 Hz	1	**GV3B38**
	Shunt trips	110, 120, 127 V 50 Hz 120, 127 V 60 Hz	1	**GV3D11**
		220, 240 V 50 Hz 240, 277 V 60 Hz	1	**GV3D22**
		380, 415 V 50 Hz 480 V 60 Hz	1	**GV3D38**
Instantaneous auxiliary contact blocks (1 per breaker) (side-mounted)	Normal early break type contacts			
	N/C + N/O		1	**GV1A01**
	N/O + N/O		1	**GV1A02**
	N/C + N/O + N/O		1	**GV1A03**
	N/O + N/O + N/O		1	**GV1A05**
	N/O+N/O+2 spare terminal blocks		1	**GV1A06**
	N/C+N/O+2 spare terminal blocks		1	**GV1A07**
Fault signalling contacts (1) (internal mount)	N/C		1	**GV3A08**
	N/O		1	**GV3A09**
Padlocking device for Start button			5	**GV1V02**

(1) only 1 voltage trip **OR** 1 fault signalling contact to be added inside the GV3 device.

Metal enclosure

Application	Type	Degree of protection of enclosure	Catalog Number
For GV3 with or without accessories	Surface mounting	IP 55	**GV3CE01**

Enclosure accessories (to be ordered separately)

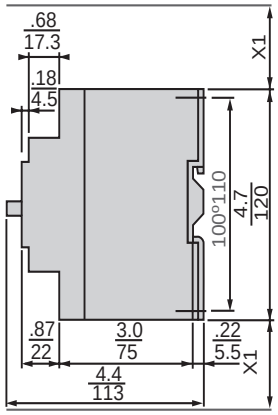
Description	Reference			
Neutral terminal, 2-pole				**LA9D40959**
IP 55 padlocking device for operators (when padlocked, the motor circuit is automatically in the Open (OFF) position)				**GV1V01**
Mushroom head "stop" pushbutton (2) Ø 40 mm, red	Spring return		1	**GV2K011**
	Latching	Key release (key #455)	1	**GV2K021**
		Turn to release	1	**GV2K031**
	Latching/Padlockable	Turn to release	1	**GV2K04**
Sealing screw for enclosure cover				**DE1DS4091**

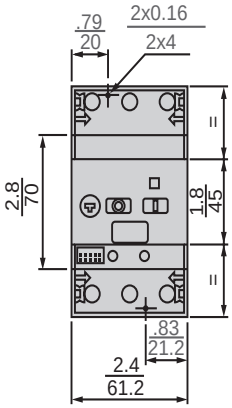
(2) Supplied with IP 55 sealing kit.

Mounting Dimensions

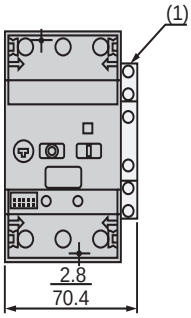
Dimensions **Inches** / MM

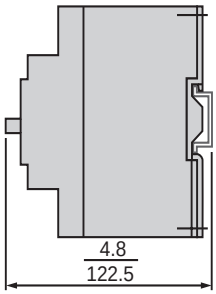
GV3M





Mounting
on rail AM1DE200 or AM1ED201



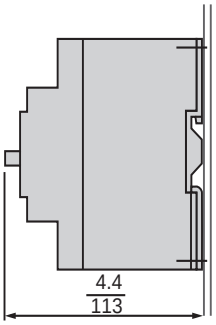


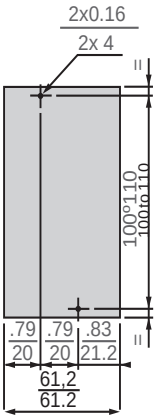
X1 = Electrical clearance (breaking at Isc max)

1.6 in/ 40 mm for Ue < 500 V
2.0 in/ 50 mm for Ue = 690 V

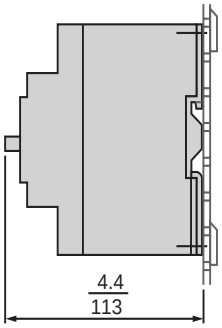
(1) Auxiliary contact blocks GV1A01 to A07

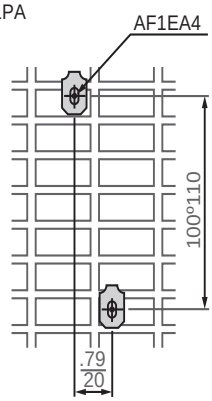
Mounting
on panel



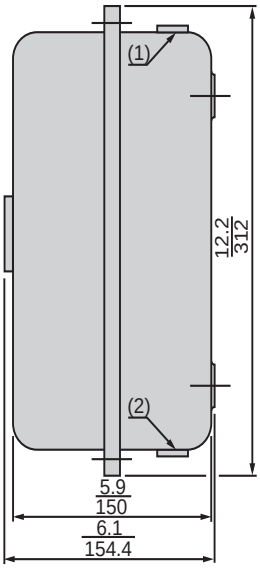


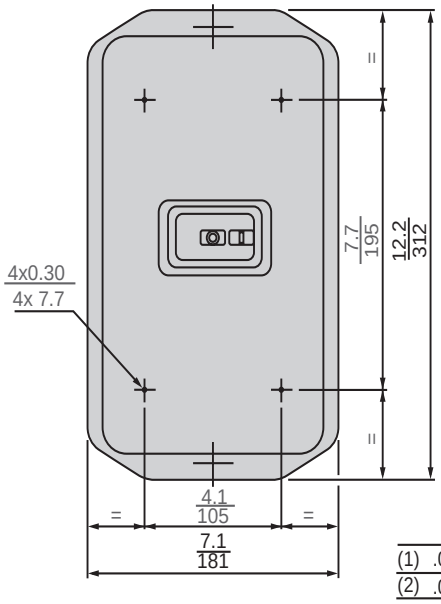
on pre-slotted mounting plate AM1PA





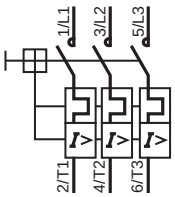
Surface mounting enclosure GV3CE01





(1) .04 x .83 in/1 x 21 mm and .04 x 1.5 in/1 x 37.5 mm blanking plugs for cable entries
(2) .04 x .83 in/1 x 21 mm and .08 x 1.5 in/1 x 37.5 mm blanking plugs for cable entries

Motor circuit breakers
GV3M

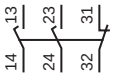


Auxiliary contact blocks

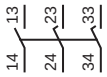
GV1A01

GV1A02

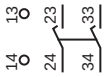
GV1A03



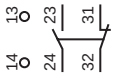
GV1A05



GV1A06

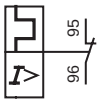


GV1A07

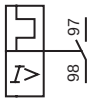


Fault signalling contacts

GV3A08



GV3A09

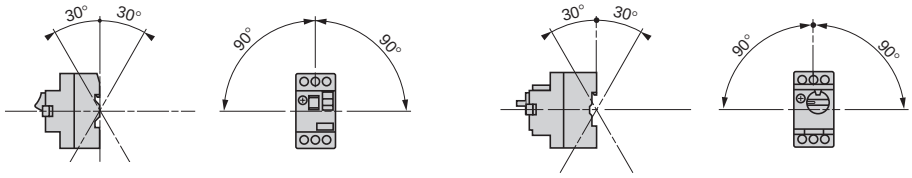


Voltage trips

GV3B

GV3D

Environment

Conforming to standards			IEC, NF C, BS, IEC, VDE
Approvals			ASE, CSA, UL, LROS, ÖVE
UL File Number			File E164864, CCN NLRV
CSA File Number			File LR 81630, Class 3211 05
Protective treatment	Standard version		"TC"
Degree of protection	Conforming to IEC 529		**GV3M** open-mounted: IP 20
			GV3M in enclosure **GV3CE01**: IP 55
Shock resistance	Conforming to IEC 68-2-27		22 g for 20 ms duration
Vibration resistance	Conforming to IEC 68-2-6		2.5 g (0-25 Hz)
Ambient air temperature	Storage		-40 to +176 °F(-40 to + 80 °C)
	Operation Open / Enclosed		-4 to +104 °F(-20 to + 40 °C)
Temperature compensation	Conforming to IEC 157-1 Open / Enclosed		-4 to +104 °F(-20 to + 40 °C)
Flame resistance	Conforming to IEC 695-2-1		Conforms for 1760 °F(960 °C)
Maximum operating altitude	Without derating		9843 ft(3000 m)
Operating position			

Type	**GV3M06 through M20**		**GV3M25 through M63**	
Wiring Number of conductors and cross sectional area (c.s.a.)	Min	Max	Min	Max
Solid cable	1-#16 to #8 AWG(1-6 mm²)	2-#16 to #8 AWG(1-6 mm²)	1-#12 to #1 AWG(2.5-35 mm²)	
Flexible cable without cable end	1-#16 to #8 AWG(1-6 mm²)	2-#16 to #8 AWG(1-6 mm²)	1-#12 to #2 AWG(2.5-25 mm²)	2-#12 to #4 AWG(2.5-16 mm²)
Flexible cable with cable end	1-#16 to #10 AWG(1-4 mm²)	2-#16 to #10 AWG(1-4 mm²)	1-#12 to #2 AWG(2.5-25 mm²)	2-#12 to #4 AWG(2.5-16 mm²)

Technical characteristics

Type			**GV3M06 through M25**	**GV3M40 through M63**
Rated insulation voltage (UI)	Conforming to IEC 158-1	**V**	690	
	Conforming to CSA C 22.2 No. 14 and UL 508	**V**	600 (B600)	
Maximum conventional rated thermal current (Ith)	Conforming to IEC 157-1	**A**	63	
Mechanical life		**ops**	100 000	50 000
Electrical life ops : Closing-opening	AC-3 duty	**ops**	100 000	50 000
Maximum operating rate		**ops/h**	25	

Technical characteristics (continued)

Tripping on phase failure	Conforming to IEC 292-1 § 7-5-3-2-2			Yes						
Cable protection against thermal stress in the event of short circuit	PVC insulated copper cables			**GV3**						
				M06 to M08	**M10**	**M14**	**M20**	**M25**	**M40**	**M63**
		Ir	**A**	1.6-4	6	10	16	25	40	63
	Minimum cross sectional area (c.s.a.) protected at 104 °F(40 °C) at Isc max	1	**mm²**		♦	♦	♦	♦	♦	♦
		1.5	**mm²**			♦	♦	♦	♦	♦
		2.5	**mm²**				♦	♦	♦	♦
		4	**mm²**							
		6	**mm²**							
		10	**mm²**							
		16	**mm²**							
	▭ protected ♦ not protected	25	**mm²**							

Voltage trip characteristics

Rated insulation voltage (Ui)	Conforming to IEC 158-1	**V**	690
	Conforming to CSA C22.2 No. 14 and UL 508	**V**	600 (B600)
Pick-up voltage			0.8-1.1 Un
Drop-out voltage			0.7-0.35 Un
Inrush consumption			12 VA 7 W
Sealed consumption			7 VA 2.5 W
Operating time (1)		**ms**	**GV3B** : 10. **GV3D** : 15
On-load factor			100 %

Wiring Number of conductors and cross sectional (c.s.a.)	Min	Max
Solid cable	1-#16 to #12 AWG(1-2.5 mm²)	2-#16 to #12 AWG(1-2.5 mm²)
Flexible cable without cable end	1-#18 to #12 AWG(0.75-2.5 mm²)	2-#18 to #12 AWG(0.75-2.5 mm²)
Flexible cable with cable end	1-#18 to #12 AWG(0.75-2.5 mm²)	2-#18 to #14 AWG(0.75-1.5 mm²)

(1) From the disappearance of Ue at the trip terminals to opening of the GV3.

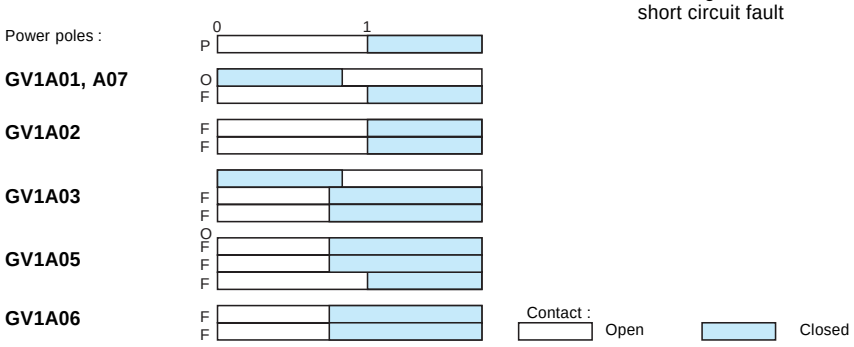
Auxiliary and fault signalling contact characteristics

Type		Instantaneous auxiliary contacts **GV1A01 to A07**							Fault signalling contacts **GV3A08 and A09**						
Rated insulation voltage (Ui) conforming to IEC 158-1	**V**	690							690						
conforming to CSA C22.2 No. 14 and UL 508	**V**	600 (B600)							600 (B600)						
Conventional rated thermal current (Ith) conforming to IEC 337-1	**A**	6							6						
conforming to CSA C22.2 No.14 and UL 508	**A**	5 (B600)							5 (B600)						
Mechanical life	**ops**	100 000							1000						
Operational power and current conforms to IEC 337-1 a.c operation	**V**	48	110 127	220 240	380 415	440	500	690	48	110 127	220 240	380 415	440	500	690
		AC-11/100 000 ops (Closing-opening)							AC-11/1000 ops (Closing-opening)						
Operational power	**VA**	350	500	800	850	700	700	400	240	460	800	850	450	450	200
Occasional breaking and making capacities	**VA**	4000	12 000	20 000	20 000	15 000	15 000	10 000	2400	8000	12 000	15 000	12 000	12 000	8000
Operational current (Ie)	**A**	6	4.5	3.5	2.2	1.5	1.5	0.6	5	3.6	3.5	2.2	1	1	0.3
Operational power and current conforming to IEC 337-1 d.c. operation	**V**	24	48	60	110	220			24	48	60	110	220		
		DC-11/100 000 ops (Closing-opening)							DC-11/1000 ops (Closing-opening)						
Operational power	**W**	180	240	180	140	120			120	120	90	70	60		
Occasional breaking and making capacities	**W**	240	360	240	210	180			180	180	135	105	90		
Operational current (Ie)	**A**	6	5	3	1.3	0.5			5	2.5	1.5	0.7	0.3		
Short circuit protection conforming to IEC 337-1		By **GB2CB08** circuit breaker for control circuits or g l fuse, 6 A max							By **GB2CB08** circuit breaker for control circuits or g l fuse, 6 A max						

Contact operation

GV3A08 and **A09** change state following an overload or short circuit fault

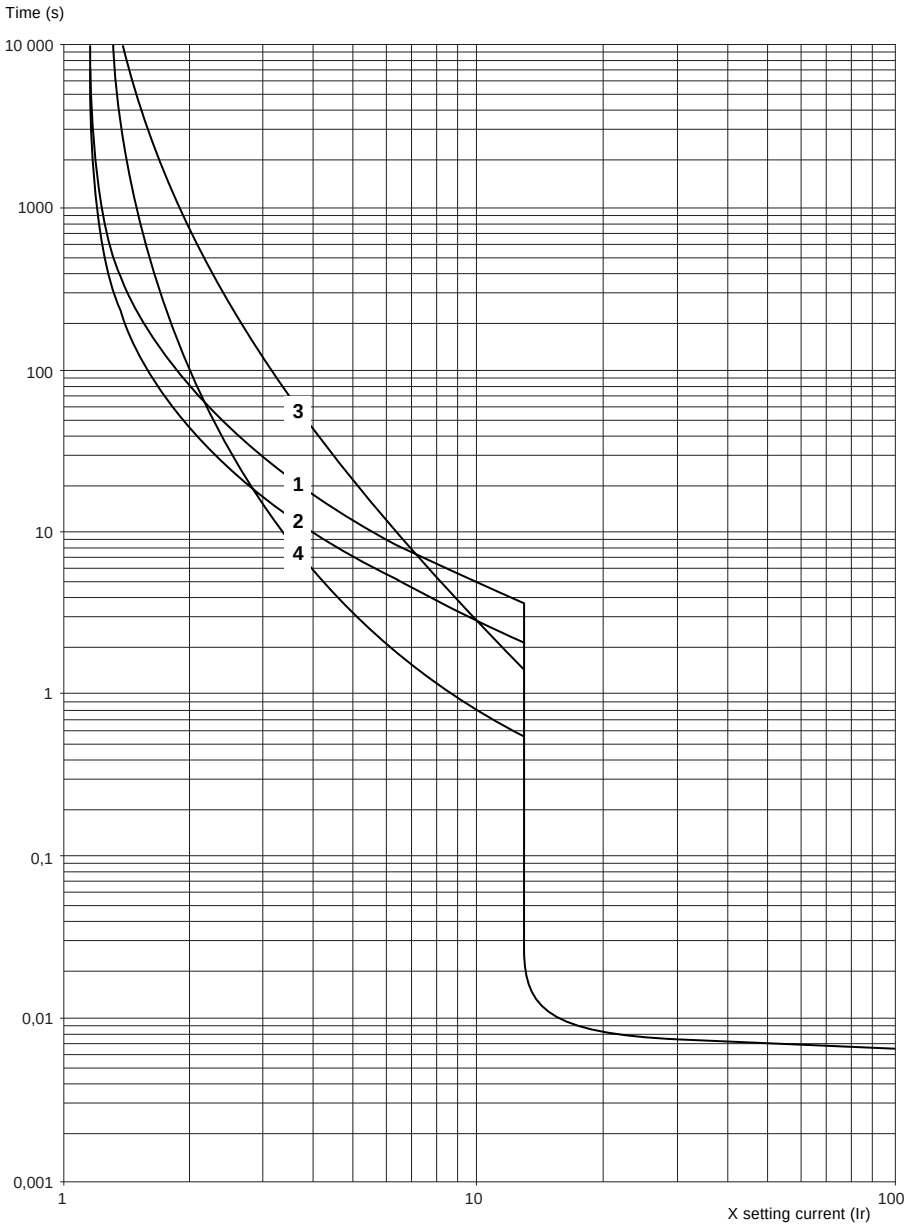
O = N/C
F = N/O



Type	Instantaneous auxiliary contacts **GV1A01 to A07**		Fault signalling contacts **GV3A08** and **A09**	
Wiring Number of conductors and cross sectional area (c.s.a.)	Min	Max	Min	Max
solid cable	1-#16 to #12 AWG(1-2.5 mm²)	2-#16 to #12 AWG(1-2.5 mm²)	1-#16 to #12 AWG(1-2.5 mm²)	2-#16 to #12 AWG(1-2.5 mm²)
flexible cable without cable end	1-#18 to #12 AWG(.75-2.5 mm²)	2-#18 to #12 AWG(.75-2.5 mm²)	1-#18 to #12 AWG(.75-2.5 mm²)	2-#18 to #12 AWG(.75-2.5 mm²)
flexible cable with cable end	1-#18 to #12 AWG(.75-2.5 mm²)	2-#18 to #14 AWG(.75-1.5 mm²)	1-#18 to #12 AWG(.75-2.5 mm²)	2-#18 to #14 AWG(.75-1.5 mm²)

Thermal-magnetic tripping curves for GV3M

Average operating time at 68°F(20 °C) according to multiples of the setting current.



1 3 poles from cold state, rating 1.6-10 A
2 3 poles from hot state, rating 1.6-10 A
3 3 poles from cold state, rating 16-63 A
4 3 poles from hot state, rating 16-63 A

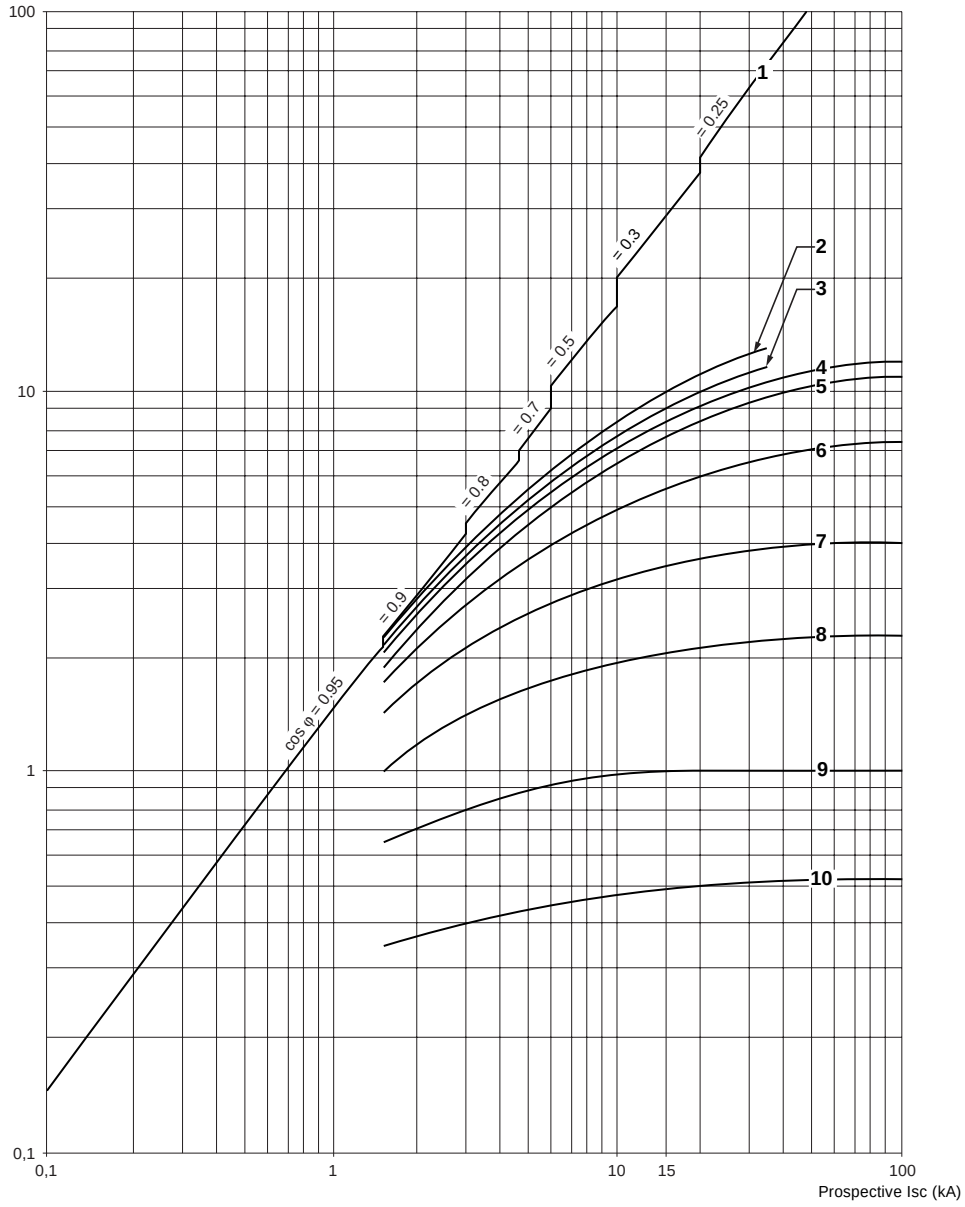
Current limitation on short circuit for GV3M

3-phase 400/415 V

Dynamic stress

I peak = f (prospective Isc) at 1.05 Ue = 435 V

Maximum peak current (kA)

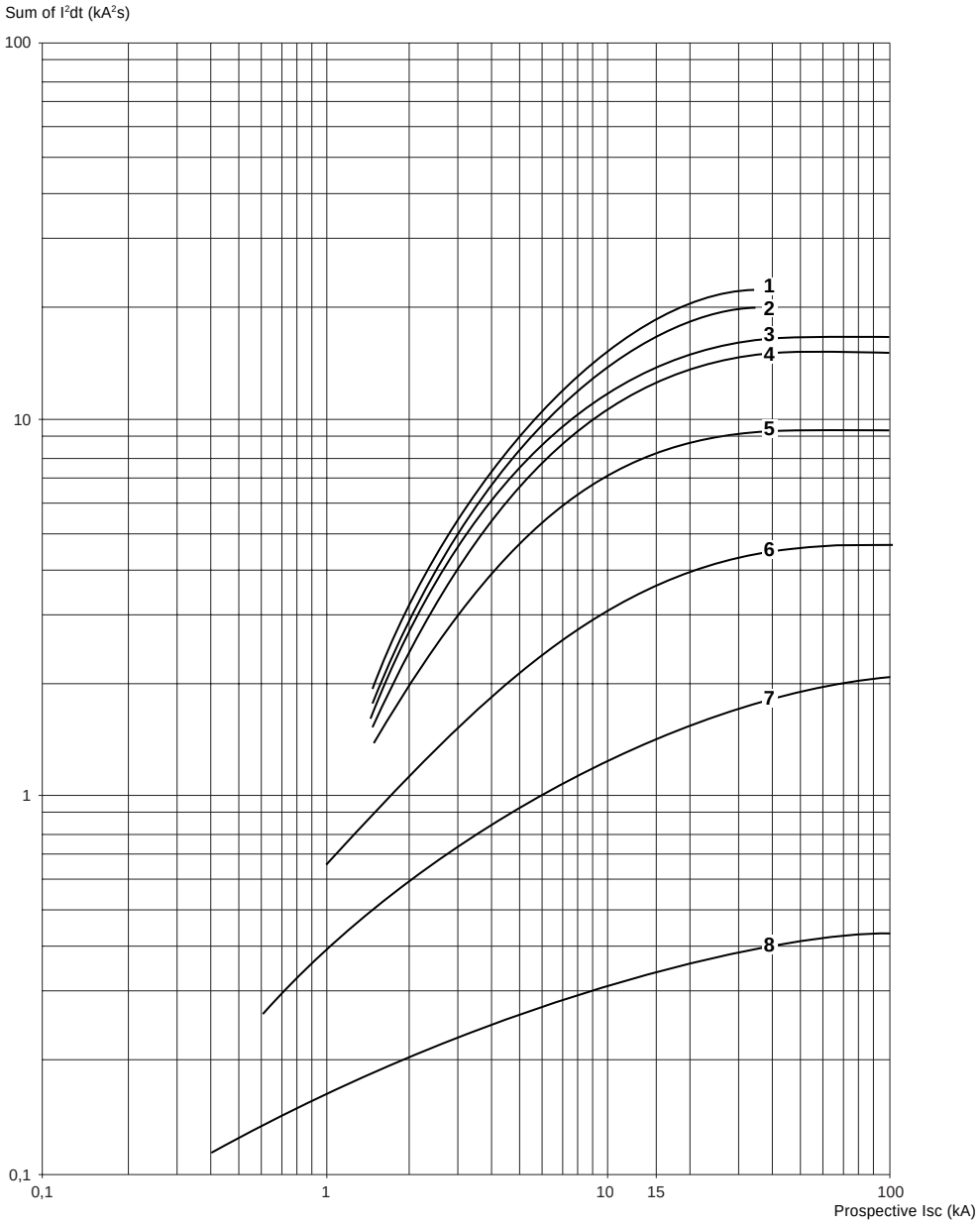


1 I peak max
2 40-63 A
3 25-40 A
4 16-25 A
5 10-16 A
6 6-10 A
7 4-6 A
8 2.5-4 A
9 1.6-2.5 A
10 1-1.6 A

Thermal limit on short circuit for GV3M

Thermal limit in kA^2s in the magnetic operating zone

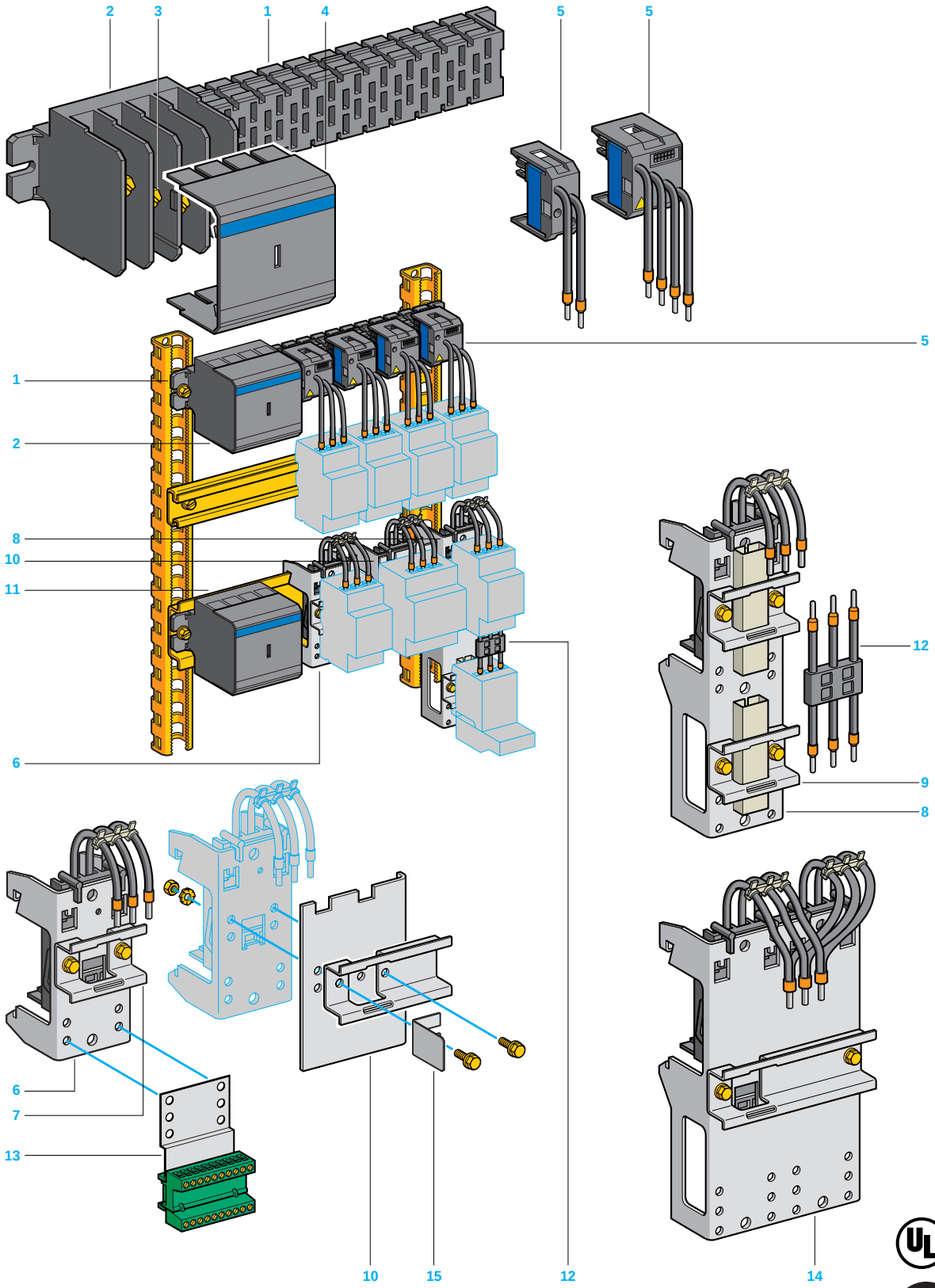
Sum of I^2dt = f (prospective Isc) at 1.05 Ue = 435 V



1 40-63 A
2 25-40 A
3 16-25 A
4 10-16 A
5 6-10 A
6 4-6 A
7 2.5-4 A
8 1.6-2.5 A

Type				GV3							
				M06 and M07	**M08**	**M10**	**M14**	**M20**	**M25**	**M40**	**M63**
Breaking capacity (Icn) conforms to IEC 157-1 (P1)	230 V		**kA**	100	100	100	100	100	100	100	100
	400/415 V		**kA**	100	100	100	100	100	100	35	35
	440 V		**kA**	100	100	100	25	25	25	25	25
	500 V		**kA**	100	100	100	8	8	8	8	8
	690 V		**kA**	100	4	4	4	4	4	4	4
Associated fuses (if required), if Isc > breaking capacity Icn	230 V	aM	**A**	♦	♦	♦	♦	♦	♦	♦	♦
		gl	**A**	♦	♦	♦	♦	♦	♦	♦	♦
	400/415 V	aM	**A**	♦	♦	♦	♦	♦	♦	250	315
		gl	**A**	♦	♦	♦	♦	♦	♦	315	400
	440 V	aM	**A**	♦	♦	♦	125	160	200	250	315
		gl	**A**	♦	♦	♦	160	200	250	315	400
	500 V	aM	**A**	♦	♦	♦	80	100	125	160	200
		gl	**A**	♦	♦	♦	100	125	160	200	250
	690 V	aM	**A**	♦	40	50	80	100	125	160	200
		gl	**A**	♦	50	63	100	125	160	200	250

♦Fuse not required : breaking capacity Icn > Isc.



AK5-ASS-3-Q

File E164867
CCN NMTR

File LR89150
Class 622801

Pre-assembled panel busbar system AK5

The assembly of automated control and distribution panels requires the use of products that are not only safe but also simple and quick to mount and cable.

The AK5 pre-assembled busbar system meets these criteria by incorporating prefabricated elements which provide 3 principal functions :

Current supply

Pre-assembled 160 A (at 35 °C) 4-pole busbar system **1**.

The busbar systems are available in 6 lengths : 344, 452, 560, 668, 992, 1100 mm (13.5", 17.8", 22", 26.3", 39", 43.3").

An incoming supply terminal block **2** is located at the extreme left of the busbar system.

“Knock-out” partitions allow cabling from above or below to the terminal block connections **3**, which are protected by a removable cover **4**.

Current distribution

The tap-offs **5** clip onto the busbar system with instantaneous mechanical and electrical connection to the busbars.

2 ratings are available : 16 and 32 A.

The tap-off units not only ensure rapid mounting but also provide visual “symmetry” for the power distribution circuit and complete safety when accessing under live circuit conditions.

Component mounting

Component mounting plate incorporating electrical tap-off.
Tap-off rating : 25 A or 50 A.

The mounting plates clip onto the mounting rail **11**, which also supports the busbar system, and at the same time make electrical connection via the incorporated tap-off.

2 types of mounting plates are available :

-single plate **6** (height 105 mm) with bolt-on 35 mm wide ⊔ rail **7**. This omega rail may be bolted in one of two positions, each with a 10 mm vertical step,

-double plate **8** and **14** (height 190 mm) with 2 bolt-on 35 mm wide ⊔ rails **9** mounted on 100 mm mounting centers. Each rail may be bolted in one of four positions, each with a 10 mm vertical step. These mounting plates are supplied with connectors **12** to allow wiring between control and protection devices.

Bolt-on width extension plates **10** are also available for mounting wider components. Using a lateral end stop **15** in conjunction with these plates also supports the AK5-JB busbar system when used vertically.

A control terminal block **13**, comprising of a support plate bolted onto the single or double mounting plates and a 10-pole plug-in block, enables connection of the control circuit wires (c.s.a. 1.5 mm^2 max.).

Pre-assembled panel busbar system AK5

Characteristics

Busbar system characteristics

Conforming to standards			IEC 439					
Approvals			UL, CSA, DNV, LROS					
UL File Number			E161251 CCN NMTR					
CSA File Number			LR 89150 Class 6228 01					
Degree of protection	Against access to live parts		IP XXB conforming to IEC 529					
Flame resistance	Conforming to IEC 695	°C	850 (incandescent wire)					
	Conforming to UL 94		V0					
Number of conductors	AK5JB14●		4					
Supply current			~					
Rated operational frequency		**Hz**	50 or 60					
Rated operational current	Ambient air temperature 35 °C	**A**	160					
	Derating coefficient K applicable to rated operational current for ambient temperature greater than 35 °C	°C	35	40	45	50	55	60
		K	1	0.96	0.92	0.88	0.83	0.78
Rated insulation voltage	- Conforming to IEC 439-1	**V**	690					
	- Conforming to UL and CSA	**V**	600					
Operational voltage			Off-load plugging-in and unplugging, with supply switched on					
	- Conforming to IEC 439-1	**V**	400					
	- Conforming to UL, CSA	**V**	480					
			Plugging-in and unplugging with supply switched off					
	- Conforming to IEC 439-1	**V**	690					
	- Conforming to UL, CSA	**V**	600					
Maximum permissible peak current		**kA**	25					
Maximum let-through energy		**A^2s**	1×10^7					
Short-circuit (1) **and overload protection**	Type of protection		Merlin Gerin circuit breaker		Fuses			
			161N	161H	aM	gF		
	Rating	**A**	160	160	160	160		
	Prospective short-circuit current	**kA**	25	50	100	100		
	Operational current	**A**	160	160	160	160		
Wiring			Maximum c.s.a.		Minimum c.s.a.			
	Flexible cable with cable end	**mm^2**	70		2.5			
	Solid cable	**mm^2**	70		2.5			
	Stranded cable	**AWG**	2/0		8			
	Tightening torque	**N•m**	10 N•m; 88 lb-in					
Mounting position	Horizontal or vertical (2)		Fixing with screws supplied					

(1) For conditions where conditional short-circuit current exceeds 25 kA.

(2) Using lateral end stop AK5BT01 in conjunction with mounting plates AK5PA.

Pre-assembled panel busbar system AK5

Characteristics

Tap-off characteristics

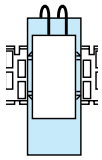
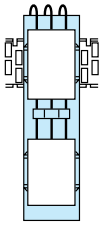
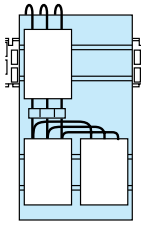
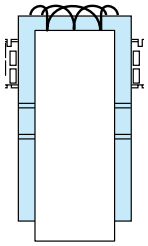
Type		**AK5 PC12PH**	**AK5 PC13**	**AK5 PC32LPH**	**AK5 PC33 PC33L**
Conforming to standards		IEC 439			
Approvals		UL, LROS, CSA, DNV			
Degree of protection		Against access to live parts : IP XXB conforming to IEC 529			
Polarity		Phase + Phase	3-phase	Phase + Phase	3-phase
Number of conductors and conductor c.s.a. (UL cables)	**mm²** **AWG**	2 x 2.5	3 x 2.5	2 x 4	3 x 4
Conductor colors		Black	Black	Black	Black
Permissible current	**A**	16	16	32	32
Rated insulation voltage	**V**	690 conforming to IEC 439-1			
Rated peak current	**kA**	6			
Maximum let-through energy	**A²s**	100,000		200,000	
Conductor insulation		PVC 105 °C			

Mounting plate/tap-off characteristics

Type		**AK5 PA231 PA232 PA232S**	**AK5 PA532**
Conforming to standards		IEC 439	
Approvals		UL, LROS, CSA, DNV	
Degree of protection		Against access to live parts : IP XXB conforming to IEC 529	
Polarity		3-phase	3-phase
Number of conductors and conductor c.s.a. (UL cables)	**mm²**	3 x 4	2 x (3 x 4)
Permissible current	**A**	25	50
Rated insulation voltage	**V**	690 conforming to IEC 439-1	
Rated peak current	**kA**	6	
Maximum let-through energy	**A²s**	200,000	
Conductor insulation		PVC 105 °C	

Characteristics of mounting rails AM1DL201 and AM1DL2017

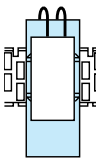
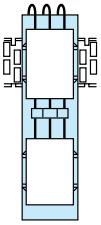
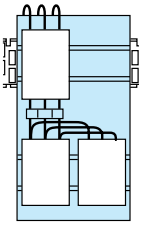
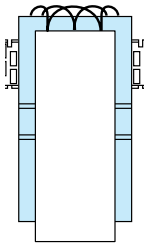
Type		“Top hat” ⊐ (width 75 mm, depth 15 mm)
Material		2 mm sheet steel
Surface treatment		Zinc chromate

		AK5PA231	AK5PA232	AK5PA232S	AK5PA532
Mounting Plate with Tap-off	Width in mm	54	54	108	108
	Height in mm	105	190	190	190
	No. of 18 mm pitches	3	3	6	6
	Rated current	25A	25A	25A	50A

Type of Starter	**Number of 18 mm pitches used on the busbar system**			
GV Manual Starters				
GV2•01 to •22 (up to 1 side-mount aux block)	3	–	–	–
GV2•01 to •22 (up to 2 side-mount aux block or 1 side-mount trip unit)	4	–	–	–
GV2•01 to •22 (up to 2 side-mount aux block and 1 side-mount trip unit)	5	–	–	–
GV2M32, GV3M01 to M40 (no limit on side-mount aux blocks)	–	–	–	6
GV Manual Starters + Contactor				
GV2•01 to •20 (up to 1 side-mount aux block) + LC1D09 to D18 (no side-mount blocks)	–	3	–	–
GV2•01 to •20 (up to 2 side-mount aux block or 1 side-mount trip unit) + LC1D09 to D18 (up to 2 LA8D••• block)	–	4	–	–
GV2•01 to •20 (up to 2 side-mount aux block and 1 side-mount trip unit) + LC1D09 to D18 (up to 2 LA8D••• block)	–	5	–	–
GV2•01 to •22 (up to 2 side-mount aux block or 1 side-mount trip unit) + LC1D09 to D18 (up to 2 LA8D••• block)◆	–	4	–	–
GV2•01 to •22 (up to 2 side-mount aux block and 1 side-mount trip unit) + LC1D09 to D18 (up to 2 LA8D••• block)◆	–	5	–	–
GV3M01 to M40 (with or without GV1•• aux) + LC1D09 to D32 (no LA8 aux) Mounted side by side	–	–	–	7
GV3M01 to M40 with GV1•• + LC1D09 to D32 (with up to 1 LA8 aux) Mounted side by side	–	–	–	8
GV Manual Starters + Reversing Contactor				
GV2•01 to •20 (no limit on GV aux blocks) + LC2D09 to D18 (no side-mount blocks)	–	–	6	–
GV2•01 to •20 (no limit on GV aux blocks) + LC2D09 to D18 (up to 1 LA8D••• block)	–	–	7	–
GV2•01 to •20 (no limit on GV aux blocks) + LC2D09 to D18 (up to 2 LA8D••• blocks)	–	–	8	–
GV2•01 to •22 (no limit on GV aux blocks) + LC2D25 to D32 (no side-mount blocks)◆	–	–	7	–
GV2•01 to •22 (no limit on GV aux blocks) + LC2D25 to D32 (up to 1 LA8D••• block)◆	–	–	8	–
GV2•01 to •22 (no limit on GV aux blocks) + LC2D25 to D32 (up to 2 LA8D••• blocks)◆	–	–	9	–

◆ Applications up to 25A only.

		AK5PA231	AK5PA232	AK5PA232S	AK5PA532
Mounting Plate with Tap-off	Width in mm	54	54	108	108
	Height in mm	105	190	190	190
	No. of 18 mm pitches	3	3	6	6
	Rated current	25A	25A	25A	50A

Type of Starter	**Number of 18 mm pitches used on the busbar system**			
Integral 18 Starter				
LD1LB030 (no add-on blocks)	3	–	–	–
LD1LB030 (up to 2 LA1LB add-on blocks)	4	–	–	–
LD1LB030 (up to 3 LA1LB add-on blocks)	5	–	–	–
Integral 32 ® Starter				
LD4LC030 (no aux blocks)	4 ◆■	–	–	6
LD4LC030 (up to 2 LA1LC aux blocks)▲	5 ◆■	–	–	6
LD4LC030 (up to 3 LA1LC aux blocks)▲	6 ◆■	–	–	6
LD4LC030 (up to 4 LA1LC aux blocks)▲	7 ◆■	–	–	7
LD4LC030 (with 1 LA1LC01• aux block and 1 reset module LA1LC052•, and up to 1 LA1LC030 aux block)	7◆■	–	–	7
LD4LC030 (with 1 LA1LC01• aux block and 1 reset module LA1LC052•, and up to 2 LA1LC030 aux block)	8 ◆■	–	–	8
Reversing Integral 18 Starter				
LD5LB130	–	–	6	–
LD5LB130 with up to 2 LA1LB add-on blocks	–	–	7	–
LD5LB130 with up to 3 LA1LB add-on blocks	–	–	8	–

◆ Applications up to 25 A only.

■ Using AK5PE17 extension plate in combination with AK5PA231 mounting plate.

▲ Auxiliary block LA1LC010 counts as two normal auxiliary blocks. (It is twice the width of the other LA1LC blocks.)

Maximum Number of Components per Busbar System

For combinations of components not shown, refer to table on pages 42-43 to determine spacing required.

Mounting Plate	Used With	AK5 Bus-bar JB143	JB144	JB145	JB146	JB149	JB1410
AK5PA231	Integral 18	4	6	8	10	16	18
	Integral 18 + 1 aux block	3	5	7	9	15	17
	Integral 18 + 2 aux block	3	4	6	7	12	14
	Integral 18 + 3 aux block	2	4	5	6	10	12
	GV2 + up to 1 side-mount aux block	4	6	8	10	16	18
	GV2 + up to 2 side-mount aux block *or* 1 side-mount trip unit	3	5	6	8	13	15
	GV2 + up to 2 side-mount aux block *and* 1 side-mount trip unit	2	4	5	6	10	12
AK5PA231 + AK5PE17◆	Integral 32 (no aux blocks) ◆ ■	3	4	6	8	13	14
	Integral 32 (1 aux block) ◆ ■	2	4	5	6	10	12
	Integral 32 (2 aux blocks) ◆ ■	2	3	4	5	9	10
	Integral 32 (3 aux blocks) ◆ ■	2	3	4	5	8	9
	Integral 32 (4 aux blocks) ◆ ■	1	2	3	4	7	8
	Integral 32 (with 1 LA1LC01• aux block and 1 reset module LA1LC052) ◆	1	2	3	4	7	8
AK5PA532	GV3 (no limit on side-mount aux blocks)	2	3	4	5	8	9
	Integral 32 (up to 3 aux blocks)	2	3	4	5	8	9
	Integral 32 (4 aux blocks)	1	2	3	4	7	8
	Integral 32 (with 1 LA1LC01• aux block and 1 reset module LA1LC052) ◆	1	2	3	4	7	8
AK5PA232 ▲	GV2 + LC1D09 to D18 (no aux blocks)	4	6	8	10	16	18
	GV2 + LC1D09 to D18 (up to 1 LA8D••• block)	3	5	7	9	15	16
	GV2 + LC1D09 to D18 (up to 2 LA8D••• blocks)	3	4	6	7	12	13
	GV2 + LC1D25 to D32 (up to 1 LA8D••• block) ◆	3	4	6	7	12	14
	GV2 + LC1D25 to D32 (up to 2 LA8D••• block) ◆	2	4	5	6	10	12
AK5PA232S▲	GV2 + LC2D09 to D18 (no side-mount blocks)	2	3	4	5	8	9
	GV2 + LC2D09 to D18 (up to 1 LA8D••• block)	1	2	3	4	7	8
	GV2 + LC2D09 to D18 (up to 2 LA8D••• blocks)	1	2	3	4	6	7
	GV2 + LC2D25 to D32 (no side-mount blocks) ◆	1	2	3	4	6	7
	GV2 + LC2D25 to D32 (up to 1 LA8D••• block) ◆	1	2	3	3	6	6
	GV2 + LC2D25 to D32 (up to 2 LA8D••• block) ◆	1	2	2	3	5	6

■ Auxiliary block LA1LC010 counts as two normal auxiliary blocks. (It is twice the width of the other LA1LC blocks).

◆ Applications up to 25 A only.

▲ For installations using a GV plus a contactor mounted one above the other, follow the steps below for determining the maximum number of devices per busbar:

1. Determine how many GVs could be installed from the AK5PA231 section above. Be sure to properly select the number of side mounted auxiliaries that will be used.
2. Determine how many contactors could be installed from the AK5PA232 (for non-reversing contactors) or AK5PA232S (for reversing contactors) section above. Be sure to properly select the number of side mounted auxiliaries that will be used.
3. Choose the smaller of the two numbers from step 1 and 2.

160 Ampere Three Phase Busbar System

AK5JB143

Total number of 18 mm "Pitches"	Maximum number of tap-offs or mounting plates: 36 mm (3 phase) Tap-Offs	Std (54 mm) mounting Plate	Double-width (108 mm) mounting plate	Busbar length in	Busbar length mm	Catalog Number
12	6	4	2	13.39	344	**AK5JB143**
18	9	6	3	17.64	452	**AK5JB144**
24	12	8	4	21.85	560	**AK5JB145**
30	15	10	5	26.05	668	**AK5JB146**
48	24	16	8	38.69	992	**AK5JB149**
54	27	18	9	42.90	1100	**AK5JB1410**

Mounting Rail

Must be used for mounting plate tap-offs.

AM1DL201

Description	Material	Depth (mm)	Length (mm)	Catalog Number
75 mm Omega Rail	2 mm steel with 10 microns of zinc chromate	15	2000	**AM1DL201**

Bus Tap-Offs

Plugs into busbar for wiring to a separately mounted device.

AK5PC33

Width (mm)	Width (in)	Rated Current	Wire Length (mm)	Wire Length (in)	Sold in Lots of	Catalog Number
36	1.42	16 A	200	7.87	6	**AK5PC13**
36	1.42	32 A	250	9.84	6	**AK5PC33**
36	1.42	32 A	1000	39.37	6	**AK5PC33L**

Mounting Plate Tap-Offs

Combines a bus tap-off with a prefabricated mounting plate for convenient mounting of contactors, GV manual starters, and Integral self-protected starters.

AK5PA232S

Application (See page 44 for mounting restrictions)	Width (mm)	Height (mm)	Number of DIN rails required	Number of 18 mm spaces	Rated Current	Catalog Number
GV2 Manual Starter Integral 18 Starter	54	105	1	3	25 A	**AK5PA231**
GV2 + Contactor	54	190	2 ▲	3	25 A	**AK5PA232**
GV2 + Reversing Contactor Reversing Integral 18	108	190	2 ▲	6	25 A	**AK5PA232S**
Integral 32 Starter GV3 + LC1D Contactor (mounted side by side)	108	190	1	6	50 A	**AK5PA532**

▲ Mounting plate tap-offs with 2 DIN rails include a 25 A rated prefabricated connector for easily wiring the top component to the bottom component.

AK5PA231

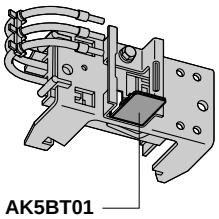
AK5PA532

Extension Plate

AK5PE17

Used to support wider components. Bolts onto standard width plate, after having removed the DIN rail.

Application	Attach mounting plate	Width (mm)	Height (mm)	Number of DIN rails	Number of 18 mm spaces required	Catalog Number
Integral 32 (for applications less than 25 A)	AK5PA231	71	105	1	4	**AK5PE17**
GV2 + Contactor (with or without side-mounted auxiliaries)	AK5PA232	71	190	2	4	**AK5PE27**



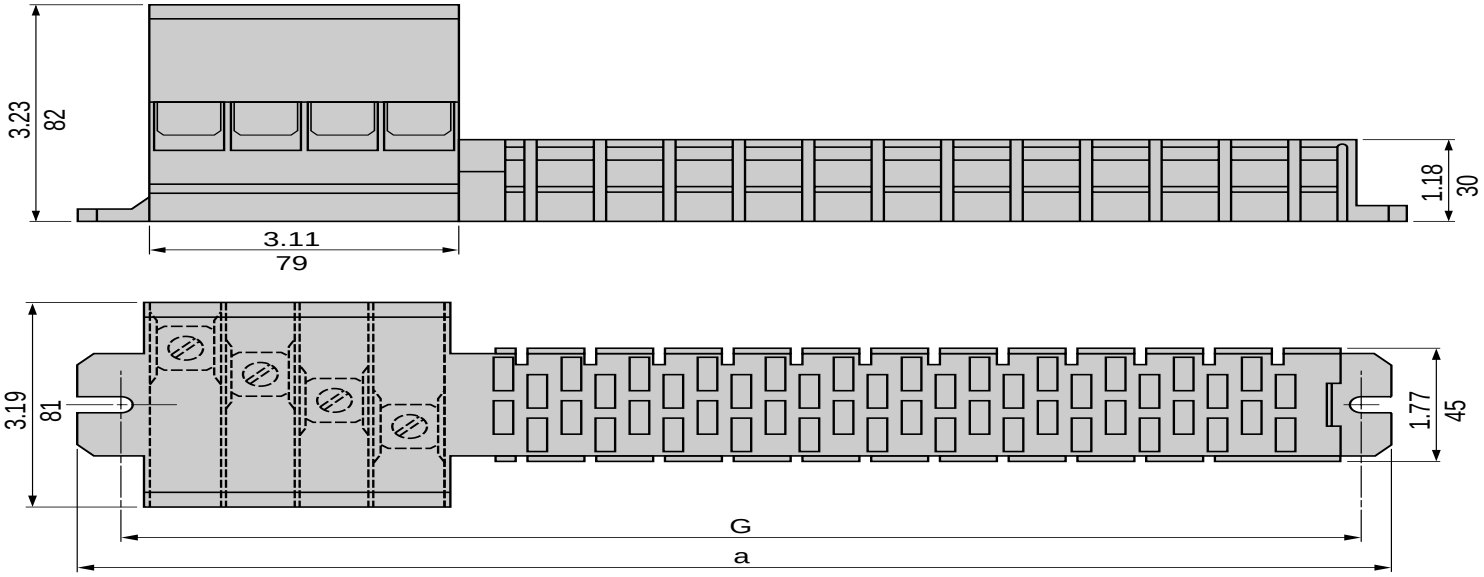
AK5BT01

Side Stop

Used to secure components on mounting plates when AK5 busbar is mounted vertically.

Description	Sold in lots of	Catalog Number
Metal side stop clip	4	**AK5BT01**

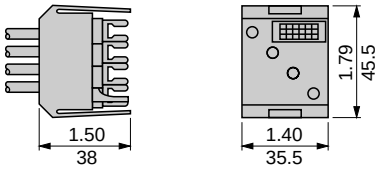
Busbar system
AK5JB ●●●



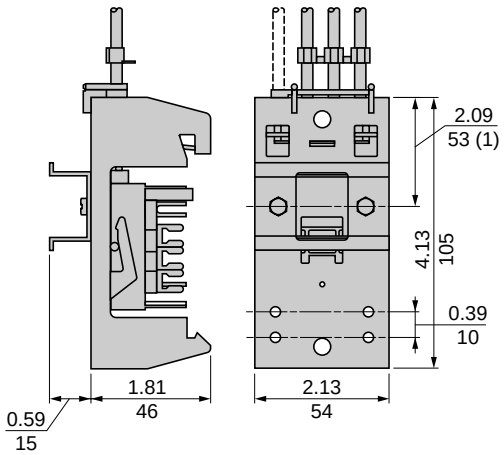
AK5	a in (mm)	G in (mm)	No. of 18 mm points
JB143	13.54 (344)	12.99 (330)	12
JB144	17.80 (452)	17.24 (438)	18
JB145	22.05 (560)	21.50 (546)	24
JB146	26.30 (668)	25.75 (654)	30
JB149	39.06 (992)	38.50 (978)	48
JB1410	43.31 (1100)	42.76 (1086)	54

Dual Dimensions inches / mm

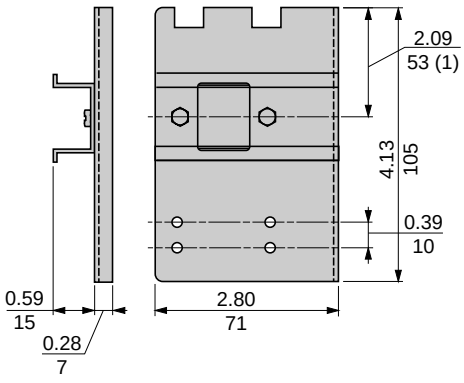
AK5PC33
AK5PC33L
AK5PC13



Mounting plates incorporating tap-offs
25 A
AK5PA231

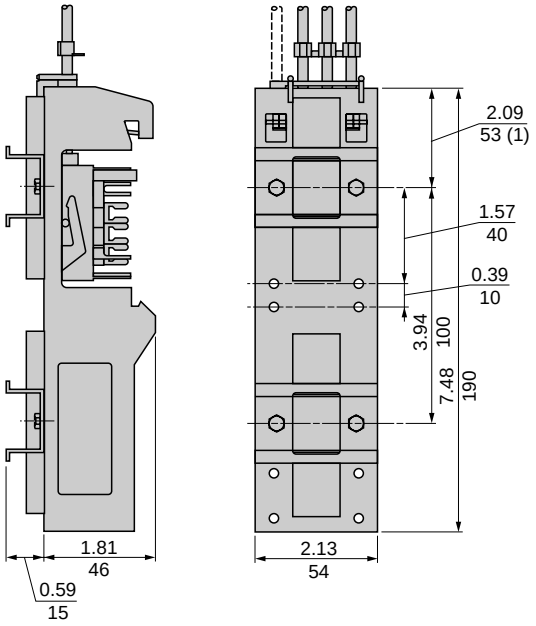


Single width
extension plates
AK5PE17

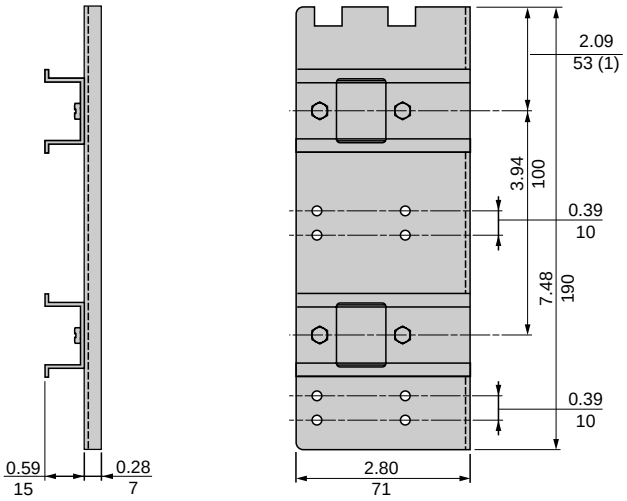


◆ Can be fixed at 1.69 in. (43 mm).

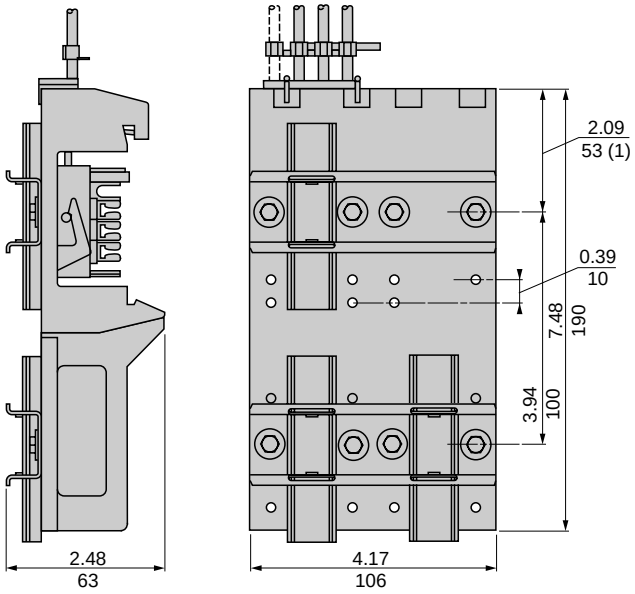
Mounting plates incorporating tap-offs
AK5PA232



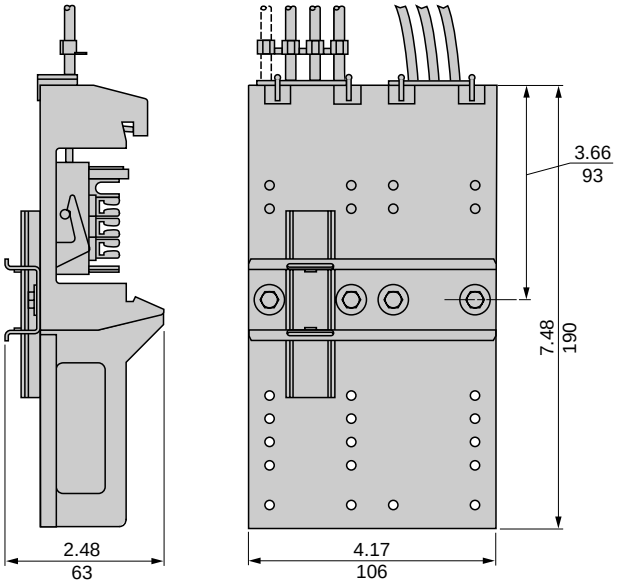
Double width extension plate
AK5PE27



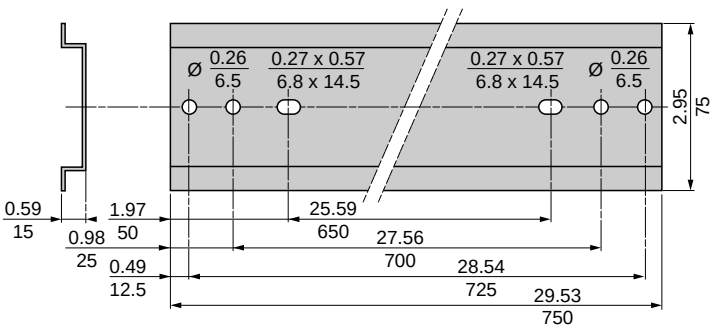
Mounting plates incorporating tap-off
AK5PA232S



AK5PA532

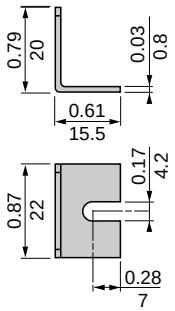


Mounting rails AM1DL201 (length 2000 undrilled)
AM1DL2017



Side stop
AK5BT01

◆ Can be fixed at 1.69 in. (43 mm).



Dual Dimensions inches / mm

Type 2 Coordinated Starters

IEC Standard 947-4-1 defines Type 2 Coordination as a level of protection which assures that a motor starter will be suitable for further use following a short circuit, although small tack welds can easily be broken. Device should be replaced during regular maintenance. Proper combination of GV manual motor starters with LC1D contactors can yield a Type 2 Coordinated installation. Refer to the table below for selection.

Three Phase HP Rating			Manual Starter	Contactor	Max. Available Fault Current (kA)
200 V	230 V	460 V			
-	-	-	GV2P02	LC1D09	50
-	-	-	GV2P03	LC1D09	50
-	-	-	GV2P04	LC1D09	50
-	-	0.5	GV2P05	LC1D09	50
-	-	0.75	GV2P06	LC1D09	50
0.5	0.5	1	GV2P07	LC1D09	50
0.75	1	2	GV2P08	LC1D09	50
1.5	1.5	3	GV2P10	LC1D09	50
2	3	5	GV2P14	LC1D09	50
3	3	10	GV2P16	LC1D18	10♦
5	5	10	GV2P20	LC1D18	10♦
5	7.5	15	GV2P21	LC1D25	6♦
5	7.5	15	GV2P22	LC1D25	6♦
10	10	30	GV3M40	LC1D40	8
20	20	40	GV3M63	LC1D80	8

♦With use of additional GV1L3 current limiter, available fault current may be increased to 50 kA.

Fuse and Circuit Breaker Selection for Group Motor Installations.

Selecting the proper upstream short circuit protection for Group Motor installations can sometimes be a confusing process. Specific National Electric Code rules must be applied for Group Motor installations. The examples below illustrate the most common applications of GV manual starters with upstream short circuit protection in a Group Motor installation. Refer to NEC Section 430-53 C and D for proper conductor ampacity selection.

Two examples are shown below:

Example 1:

8 motors with the sizes shown below are installed on a conveying system. Choose the correct GV manual starter and the proper size short circuit protection for this application. The user prefers time-delay fuses to circuit breakers.

Motor Qty	HP	Voltage	FLA
1	5	460	7.6
2	3	460	4.8
5	2	460	3.4

One GV2M14, two GV2M10, and five GV2M08 manual starters would be selected for this group motor installation.

Per N.E.C. section 430-52 & -53 and N.E.C. table 430-152, the time-delay fuse must be sized as follows:

175% FLA for largest motor + sum of FLAs for all other motors
==> (1.75 x 7.6) + (2 x 4.8) + (5 x 3.4) = 39.9 A

N.E.C. 430-52 allows use of the next largest *standard* size fuse — which in this case is 40 A. If nuisance tripping was a problem with this fuse selection, N.E.C. does allow 225% of largest motor FLA to be used in lieu of 175% when calculating the size. In this case, the calculation would be as follows:

(2.25 x 7.6) + (2 x 4.8) + (5 x 3.4) = 43.7 A

The next largest standard size in this case is a 45 A fuse.

Example 2:

10 motors with the sizes shown below are installed on a packaging machine. Choose the proper size circuit breaker for this application.

Motor Qty	HP	Voltage	FLA
2	10	460	14
1	5	460	7.6
2	3	460	4.8
5	2	460	3.4

Per N.E.C. section 430-52 & -53 and N.E.C. table 430-152, the circuit breaker must be sized as follows:

250% FLA for largest motor + sum of FLAs for all other motors
==> (2.5 x 14) + 14 +7.6 + (2 x 4.8) + (5 x 3.4) = 83.2 A

The next largest standard size circuit breaker is 90 A.

If nuisance tripping is a problem, N.E.C. allows 400% of largest motor FLA to be used in lieu of 250% when calculating the circuit breaker size. For this case:

(4.0 x 14) + 14 +7.6 + (2 x 4.8) + (5 x 3.4) = 104.2 A

The next largest standard size in this case is a 110 A circuit breaker.

NOTES:

Square D Company
P.O. Box 27446
Raleigh, NC 27611, USA
(919) 266-3671

Catalog No. 2520CT9501R6/97 December 1997
Replaces 2520CT9501 dated 6/96.