Section 15

Operating Mechanisms and Disconnect Switches



Electromechanical
Reduced Voltage Starter

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200 A Switch



30 A Side Handle
GS1EERU30



Compact 30 A Switch

Catalog Number Identification System

The GS1 part numbers can be identified as shown in Table 15.1.
See Catalog 9421CT0301 for specific applications.

Table 15.1: Identification System

			GS1	D	U	3
Model GS1 Fusible (Class J fuse unless noted), LK3 Nonfusible						
Current Range, Operator Type (front operator unless noted), Accessory Type						
D	30 A front and side operation	**T**	800 A (Class L if fused)			
DD	30 A Class CC front and side operation	**U**	1000 A			
E	30 A	**W**	1200 A			
EE	30 A Class CC	**AH**	handle			
G	60 A	AHT	handle with test			
J	100 A	AE	extension shaft			
M	200 A	AD	auxiliary contact holder			
Q	400 A	AM	auxiliary contact			
S	600 A					
UL Certification						
Poles—Number of Poles, 2 or 3						

NOTE: All fusible switches through 400 A, and nonfused switches through 200 A, are equipped with a feature to test the optional auxiliary contacts without energizing the load, when the appropriate GS1AHT•••• handle is used.

Table 15.2: Fusible Switches, 3-pole

Catalog No.	Rating	Fuses	Shaft to Use
Compact GS1 Fusible IEC Style Disconnect Switches			
GS1DDU3	30 A	Class CC	5x5 shaft
GS1DU3	30 A	Class J	5x5 shaft
GS1 Fusible IEC Style Disconnect Switches			
GS1EEU3	30 A	Class CC	10x10 shaft
GS1EU3	30 A	Class J	10x10 shaft
GS1GU3	60 A	Class J	10x10 shaft
GS1JU3 *[1] [2]*	100 A	Class J	10x10 shaft
GS1MU3 *[1] [2]*	200 A	Class J	10x10 shaft
GS1QU3 *[1]*	400 A	Class J	10x10 shaft
GS1SU3 *[1] [2]*	600 A	Class J	15x15 shaft
GS1TU3 *[1]*	800 A	Class L	15x15 shaft

Table 15.3: Fusible Switches with Direct Mount Side Handle

Catalog No.	Description
GS1EERU20	30 A, 2-pole, Class CC
GS1EERU30	30 A, 3-pole, Class CC
GS1AH01	Right-side handle for GS1EERU20 and GS1EERU30

Table 15.4: Nonfusible Switches, 3-pole

Catalog No.	Rating	Shaft to Use
Compact LK3 Nonfusible IEC Style Disconnect Switches		
LK3DU3 *[2]*	30 A	5x5 shaft
LK3 Nonfusible IEC Style Disconnect Switches		
LK3GU3	60 A	10x10 shaft
LK3JU3 *[2]*	100 A	10x10 shaft
LK3MU3 *[1]*	200 A	10x10 shaft
LK3QU3 *[1]*	400 A	15x15 shaft
LK3SU3 *[1]*	600 A	15x15 shaft
LK3TU3 *[1]*	800 A	15x15 shaft
LK3UU3 *[1]*	1000 A	15x15 shaft
LK3WU3 *[1]*	1200 A	15x15 shaft

For example:
LK3SU3 (600 A nonfusible switch, use 15x15 shaft)
+ **GS1AE6** (15x15 200 mm Type H shaft)
+ **LK3AH150** (black/black, lockable)

To add auxiliary contacts:
For front-mounted contacts order
GS1AD30 (front-mounted auxiliary contact holder)
+ **GS1AM110** (NO contact for GS1AD10, 20, 30)

Example of the parts to order to build a complete GS or LK switch:

Choose a Switch	+	Shaft	+	Handle Assembly	+	Lugs, if needed
600 A, LK3SU3		Shaft 200 mm, GS1AE6		Black Handle, LK3AH150		Lugs Kit, GS1AW503









[1] Shipped with line side terminal shrouds—for additional shrouds, see Table 15.12. Terminal lug must be ordered separately—see Table 15.11.
[2] Obsolete.

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Handles



GS1AH10



GS1AH102
Type D—alternate handles for compact switches only



GS1AE7/AE71 Shafts
5 mm x 5 mm
Compact Shaft Kits





GS1AH101
GS1AH120
Type G—Standard Handle Design
Use these shaft kits when using compact switches:



GS1AE8/AE81 Shafts
5 mm x 5 mm

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LK3AH160



GS1AE6



GS1AE2/AE21 Shafts

Table 15.5: Operating Handles for Compact GS1 and LK3 for Use with Shaft Type D

Type NEMA/UL	Type IEC	Defeatable	Padlockable	Color	Operation	Catalog Number
1, 12	IP54	Yes	Yes	Black	Off/On (O/I)	GS1AH101
				Red/Yellow		GS1AH102

Table 15.6: Operating Handles for Compact GS1 and LK3 for Use with Shaft Type G

Type NEMA/UL	Type IEC	Defeatable	Padlockable	Color	Operation	Catalog Number
1, 3R, 12	IP54	Yes	Yes	Black	Off/On (O/I)	GS1AH110
				Red/Yellow	Off/On (O/I)	GS1AH120
				Black	Test/Off/On (T/O/I)	GS1AHT110
				Red/Yellow	Test/Off/On (T/O/I)	GS1AHT120
1, 3R, 4, 4X, 12	IP65	Yes	Yes	Black	Off/On (O/I)	GS1AH410 *[3]*
				Red/Yellow	Off/On (O/I)	GS1AH420
				Black	Test/Off/On (T/O/I)	GS1AHT410
				Red/Yellow	Test/Off/On (T/O/I)	GS1AHT420

Table 15.7: Operating Handles for Standard GS1 and LK3

Type NEMA/UL	Type IEC	Defeatable	Padlockable	Color	Operation	Catalog Number
GS1 30–100 A and LK3 60–100 A (3 in. handles)						
1, 3R, 12	IP54	Yes	Yes	Black	Off/On (O/I)	GS1AH110
				Red/Yellow	Off/On (O/I)	GS1AH120
				Black	Test/Off/On (T/O/I)	GS1AHT110
				Red/Yellow	Test/Off/On (T/O/I)	GS1AHT120
1, 3R, 4, 4X, 12	IP65	Yes	Yes	Black	Off/On (O/I)	GS1AH410
				Red/Yellow	Off/On (O/I)	GS1AH420
				Black	Test/Off/On (T/O/I)	GS1AHT410
				Red/Yellow	Test/Off/On (T/O/I)	GS1AHT420
GS1 200–400 A and LK3 200 A (5 in. handles)						
1, 3R, 12	IP54	Yes	Yes	Black	Off/On (O/I)	GS1AH130
				Red/Yellow	Off/On (O/I)	GS1AH140
				Black	Test/Off/On (T/O/I)	GS1AHT130
				Red/Yellow	Test/Off/On (T/O/I)	GS1AHT140
1, 3R, 4, 4X, 12	IP65	Yes	Yes	Black	Off/On (O/I)	GS1AH430
				Red/Yellow	Off/On (O/I)	GS1AH440

Table 15.8: Operating Handles for Use with Shaft Type H

Type NEMA/UL	Type IEC	Defeatable	Padlockable	Color	Operation	Catalog Number
For LK3 400–1200 A						
1, 3R, 4, 4X, 12	IP65	No	Yes	Black	Off/On (O/I)	LK3AH150 *[3]*
		No		Red/Yellow		LK3AH160 *[3]*
		Yes		Black		LK3AH170
		Yes		Red/Yellow		LK3AH180
For GS1 600–800 A						
1, 3R, 4, 4X, 12	IP65	No	Yes	Black	Off/On (O/I)	LK3AH150 *[3]*
		No		Red/Yellow		LK3AH160 *[3]*
		Yes		Black		GS1AH170
		Yes		Red/Yellow		GS1AH180 *[3]*

NOTE: UL approved for indoor or outdoor applications.

Table 15.9: Shafts

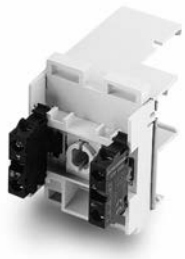
Length in.	Length mm	Catalog No.
Shaft 5 mm x 5 mm—For use with Operating Handles, Type D		
12.6	320	GS1AE7
15.7	400	GS1AE71 *[3]*
Shaft 5 mm x 5 mm—For use with Operating Handles, Type G		
12.6	320	GS1AE8 *[3]*
15.7	400	GS1AE81
Shaft 10 mm x 10 mm—For Standard GS1 and LK3		
12.6	320	GS1AE2
15.7	400	GS1AE21
Shaft 15 mm x 15 mm—For use with Operating Handles, Type H		
7.9	200	GS1AE6 *[3]*
15.7	400	GS1AE61 *[3]*

[3] Obsolete.

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GS1AD10 + GS1AM110



GS1AD20 + GS1AM110



GS1AD30 + GS1AM110



Terminal Lugs



Terminal Shrouds



Shorting Links

Accessories

Table 15.10: Auxiliary Contacts

Type	Description	Catalog No.
For Compact LK3 / GS1		
U = Upper or Top mounted	Standard products allow up to 4 auxiliary contacts without any extra contact holders. Contact holder (for 5 to 8 auxiliary contacts)	GS1AD10
10 A	1 N.O. Contact Block	GS1AM110
600 Vac	1 N.C. Contact Block	GS1AM101
For LK3 60–200 A, GS1 30–400 A		
U = Upper or Top mounted	Contact holder required (for 1 to 8 upper auxiliary contacts)	GS1AD20
10 A	1 N.O. Contact Block	GS1AM110
600 Vac	1 N.C. Contact Block	GS1AM101
S = Side mounted *[4]*	1 N.O. & N.C. Contact Block (max of two blocks—any mix)	GS1AN11
	2 N.O. & N.C. Contact Block (max of two blocks—any mix)	GS1AN22
S = Side mounted *[4]*	1 N.O. & N.C. Contact Block w/ Test (max of two blocks—any mix)	GS1ANT11 *[5]*
	2 N.O. & N.C. Contact Block w/ Test (max of two blocks—any mix)	GS1ANT22 *[5]*
For LK3 400–1200 A		
U = Upper or Top mounted	Contact holder (for 1 to 4 auxiliary contacts)	LK3AD30
10 A	1 N.O. Contact Block	GS1AM110
600 Vac	1 N.C. Contact Block	GS1AM101
For GS1 600–800 A		
Micro-switch (top mounted)	1 N.O./N.C. Contact	GS1AMU3 *[5]*
	2 N.O./N.C. Contact	GS1AMU4 *[5]*

Table 15.11: Terminal Lugs

For Use On	Wire Size (AWG)	No. of Wires per Lug	Wire Type	Lugs per Kit	Catalog No.
Compact GS1/LK3	14–10	1	Cu	—	Standard
GS1 30 A CC	14–10	1	Cu	—	Standard
GS1 30 A J	14–10	1	Cu	—	Standard
GS1/LK3 60 A J	10–3	1	Cu	—	Standard
LK3 100 A	14–2/0	1	Cu	—	Standard
GS1 100 A	14–2/0	1	Cu/Al	6	GS1AW303
GS1/LK3 200 A	6–3/0	1	Cu/Al	6	GS1AW403
GS1/LK3 400–600 A *[6]*	2 x 2–2 x 600	2	Cu/Al	6	GS1AW503
GS1/LK3 800 A / LK3 1000 A *[6]*	3 x 2–3 x 600	3	Cu/Al	6	GS1AW803 *[5]*
LK3 1250 A *[6]*	4 x 2–4 x 600	2	Cu/Al	12	GS1AW903

Table 15.12: Terminal Shrouds

For Use On	Catalog No.
For Line or Load Side *[7]*	
Compact GS1/LK3	Standard
All GS1/LK3 30 A	Standard
All GS1/LK3 60 A	Standard
LK3 100 A	Standard
GS1 100 A *[8]*	GS1AP33
GS1/LK3 200 A *[8]*	GS1AP43
GS1 400 A	GS1AP63
LK3 400–600 A	LK3AP63
GS1 600–800 A	GS1AP83
LK3 800–1250 A	LK3AP83

Table 15.13: Shorting Links

For Use On	Shorting Links per Kit	Catalog No.
GS1 60 A	3	GS1AU203
GS1 100 A		GS1AU303
GS1 200 A		GS1AU403
GS1 400 A		GS1AU503
GS1 600–800 A		GS1AU803

Table 15.14: Shaft Padlocking Kit

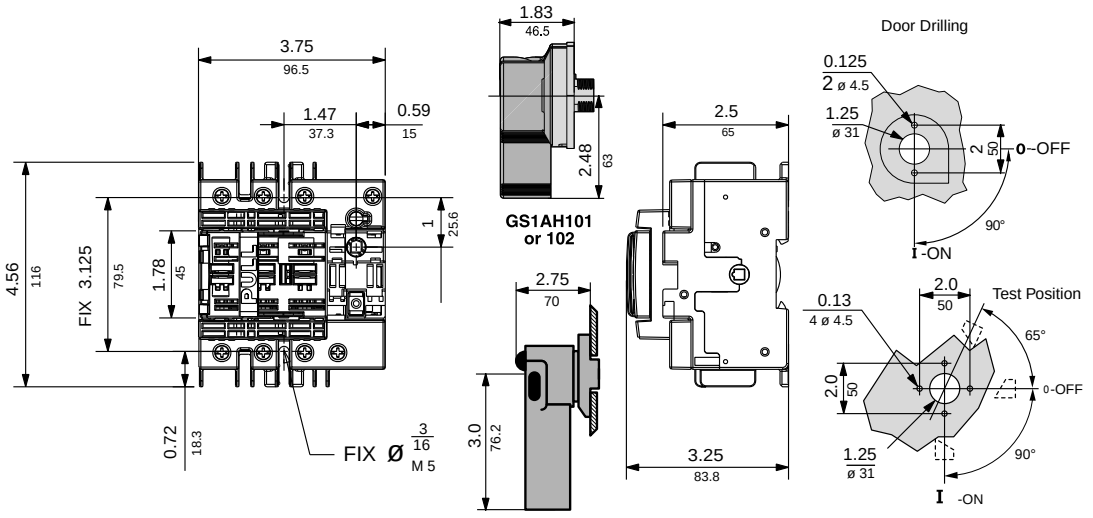
For Use On	Catalog No.
Compact GS1/LK3	Standard
LK3 60–200 A	
GS1 30–400 A	
LK3 400–1250 A	

[4] A GS1AN•• contact block may not be used on the same switch as a GS1ANT••. A single switch must use all GS1AN11/GS1AN22 contact blocks **or** all GS1ANT11/GS1ANT22 contact blocks.
[5] Obsolete.
[6] GS1 600–800 A and LK3 800–1250 A can receive 1 lug for 3 cables per terminal or 2 lugs for 2 cables per terminal.
[7] All GS1 and LK3 switches are provided with line side shrouding.
[8] Three-piece kit for either the line or load side.

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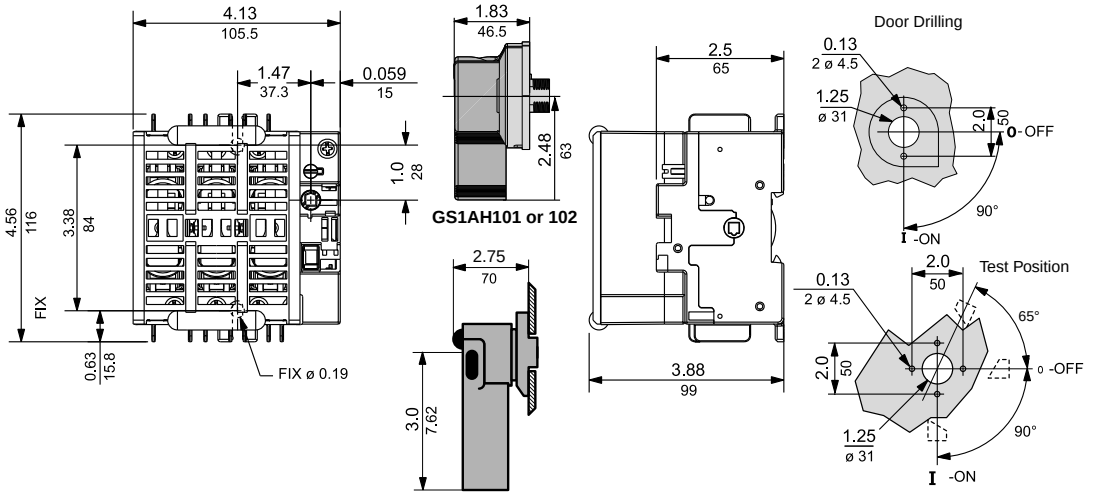
Dimensions

GS1DDU3
Compact
30 A rating
Class CC fuses



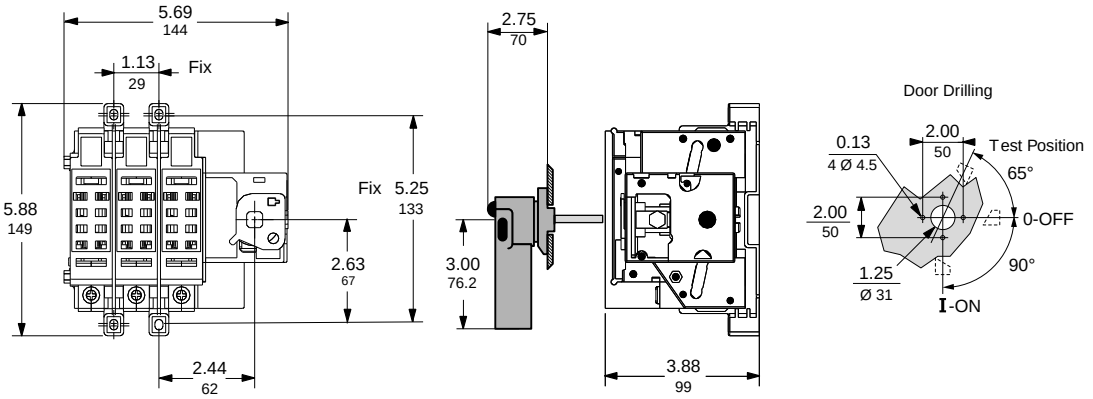
GS1AH/AHT110, 120, 410, or 420

GS1DU3
Compact
30 A rating
Class J fuses



GS1AH/AHT110, 120, 410, or 420

GS1EEU3
30 A rating
Class CC fuses

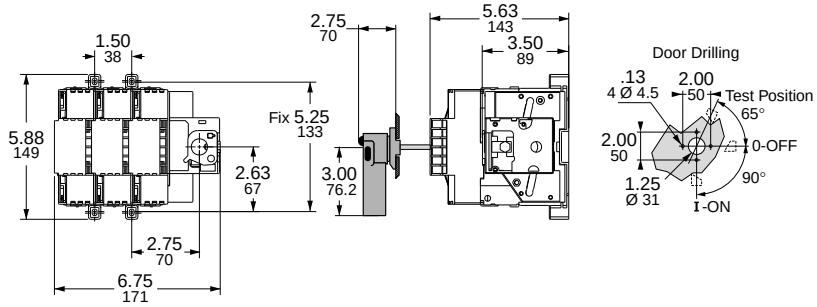


GS1AH/AHT110, 120, 410, or 420

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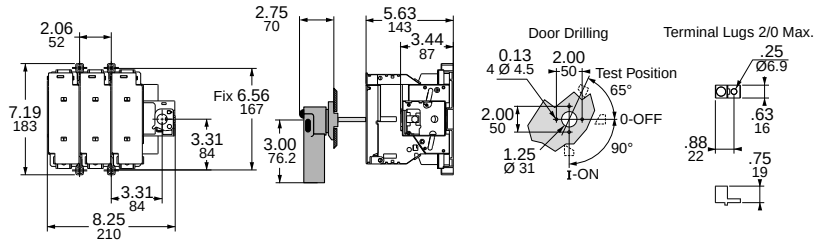
GS1 Dimensions

GS1EU3/GS1GU3, 30 and 60 A (Class J)



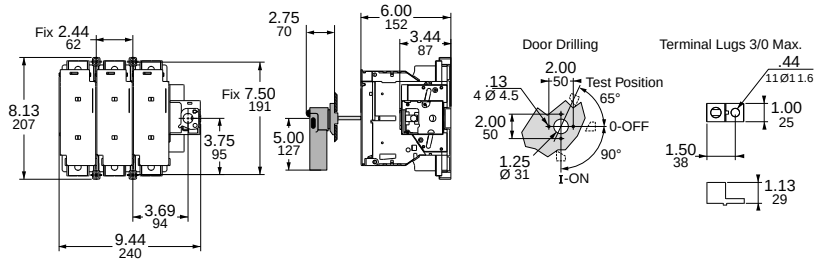
Mounting Hole Dimension: 0.19 in. (4.8 mm)

GS1JU3, 100 A (Class J)



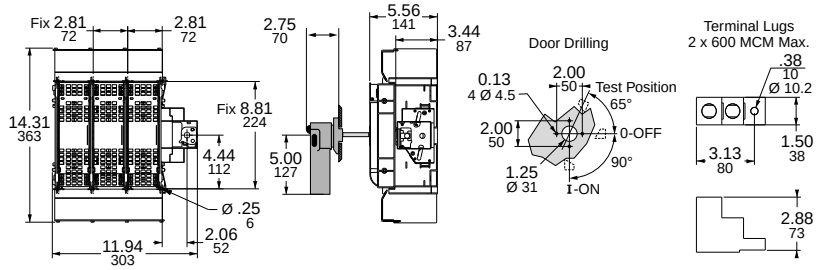
Mounting Hole Dimension: 0.19 in. (4.8 mm)

GS1MU3, 200 A (Class J)



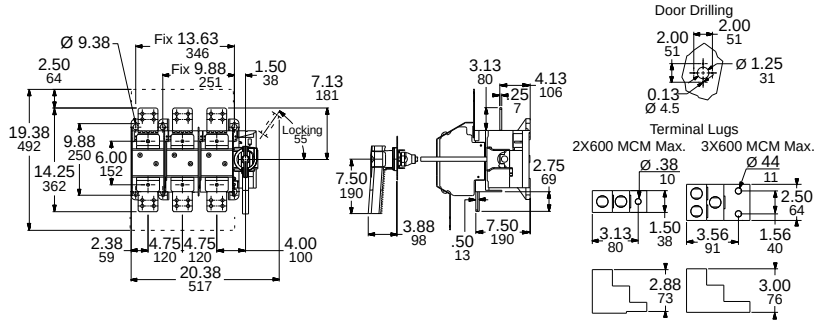
Mounting Hole Dimension: 0.19 in. (4.8 mm)

GS1QU3, 400 A (Class J)



Mounting Hole Dimension: 0.25 in. (6.3 mm)

GS1SU3/GS1TU3, 600 A (Class J) and 800 A (Class L)

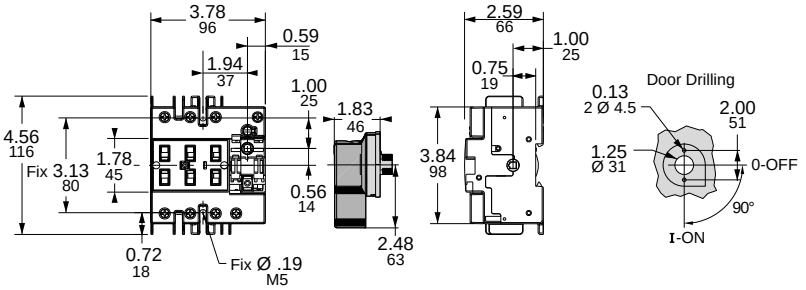


Mounting Hole Dimension: 0.38 in. (9.6 mm)

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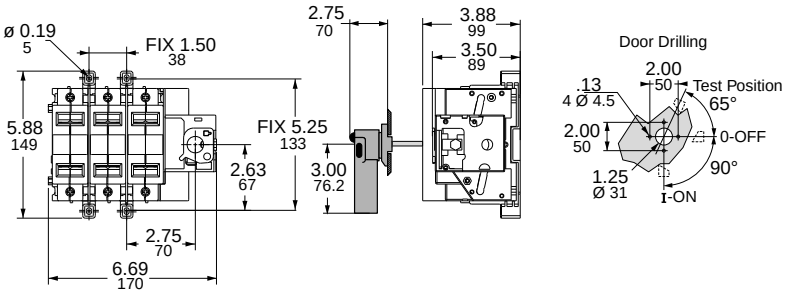
LK3 Dimensions

LK3DU3, Compact LK3 30 A



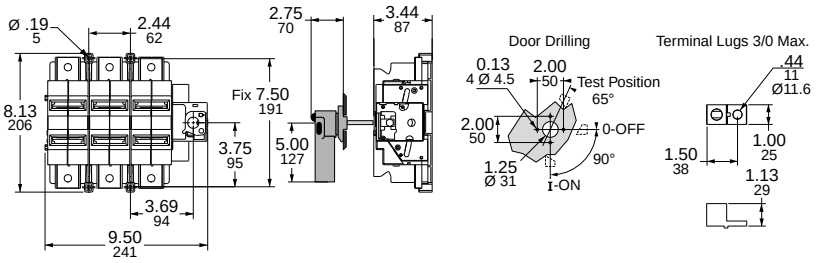
Mounting Hole Dimension: 0.19 in. (4.8 mm)

LK3GU3/LK3JU3, 60 and 100 A



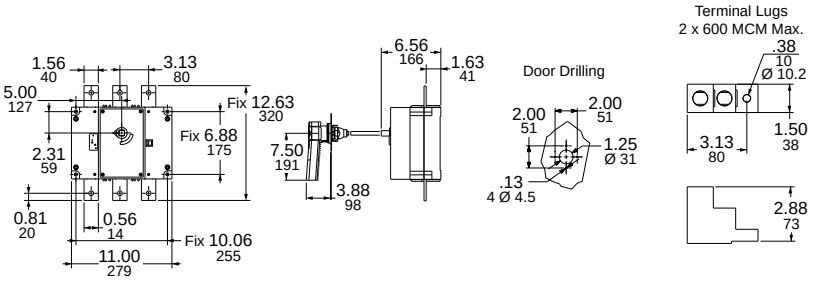
Mounting Hole Dimension: 0.19 in. (4.8 mm)

LK3MU3, 200 A



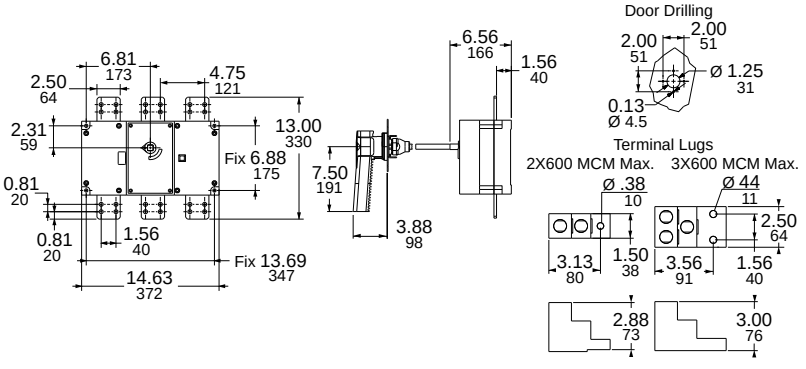
Mounting Hole Dimension: 0.19 in. (4.8 mm)

LK3QU3/LK3SU3, 400 and 600 A



Mounting Hole Dimension: 0.25 in. (6.3 mm)

LK3TU3/LK3UU3/ LK3WU3, 800, 1000, and 1250 A

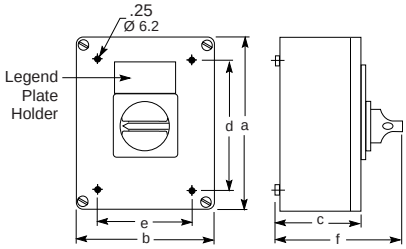


Mounting Hole Dimension: 0.38 in. (9.6 mm)

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Non-Metallic Enclosure



VC1GU–VC6GU

Vario

The Vario motor disconnect switch is also offered as an enclosed switch made of corrosion resistant material. The 3-pole version makes the Vario switch ideal for manual motor control applications. The switches are compact, easy to wire and connect, and come undrilled to allow variable cable entry positions.

NOTE: VCGUN enclosures are UL approved.

Table 15.15: Non-Metallic Enclosed Switches *[1]*

Ampere Size		IP55-PVC 3-Pole, NEMA Type 1 & 12
UL	IEC	Catalog No.
20	32	VC1GUN
25	40	VC2GUN
45	63	VC3GUN
63	80	VC4GUN
100	125	VC5GUN
115	175	VC6GUN

Table 15.16: Non-Metallic Enclosed Switch Dimensions

Catalog No. *[2]*	No. of Poles	Dimensions											
		a		b		c		d		e		f	
		in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
VC1GU–VC2GU	3	6.7	170	4.1	105	3.2	82	4.8	122	2.1	53	5.0	128
VC3GU–VC4GU		6.7	170	5.3	135	3.3	85	5.1	130	3.7	95	5.2	131
VC5GU–VC6GU		11.0	280	8.6	220	5.0	126	7.9	201	7.5	190	8.6	203

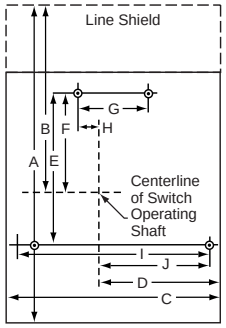
Table 15.17: Vario Manual Motor Control Switches, IEC

Rating (A) IEC	kW Rating				3-Pole Switch Body	
	230 V	240 V	400 V	415 V	500 V	690 V
20	4	4	5.5	5.5	7.5	11
25	5.5	5.5	7.5	7.5	11	15
32	5.5	5.5	11	11	11	15
40	7.5	7.5	15	15	18.5	15
63	15	15	22	22	30	22
80	18.5	18.5	30	30	37	30
125	22	22	37	37	45	37
175	30	30	45	45	55	45

[1] Assembled, includes switches mounted in an enclosure with a handle.
[2] UL Rated, NEMA Type 1, 12, IP55.

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File D10

The D10 disconnect switch features high I²T rating, longer contact life, visible contact indication, fuse-mounting flexibility, dead-front construction, and auxiliary interlocks.

A complete installation includes a D10 disconnect switch, D11 handle operator, and D12 fuse clip kit. The D10 accepts Class H, K, J, or R fuses, or can be used for nonfusible applications. The D10 disconnect switch is operated by a cast metal handle operator that is lockable in the Off position and defeatable in the On position.

Table 15.18: Lug Data

Rating (A)	Number Per Pole	Wire Range *[1]*	Wire Type
30	1	14–8 AWG	Cu
60		14–4 AWG	Cu
100		14–1/0 AWG	Al–Cu
200		6 AWG – 250 kcmil	Al–Cu

Table 15.19: Fuse Clip Kits

D10 Switch Size	Fuse Clip Rating *[2]*			Catalog Number
	Amperes	AC Volts	Type	
30 A	No Fuse			D12C01
	0–30	250	H, K	D12C21 *[3]*
	0–30	250	R	D12CR21
	0–30	600	H, K	D12C61
	0–30	600	R	D12CR61
	0–30	600	J	D12CJ1
	31–60	250	H, K	D12C22 *[3]*
	31–60	600	H, K	D12C62
	31–60	600	R	D12CR62
	31–60	600	J	D12CJ2 *[3]*
	61–100	250	H, K	D12C23
60 A	No Fuse			D12D02
	0–30	250	R	D12DR21 *[3]*
	0–30	600	H, K	D12D61
	0–30	600	R	D12DR61
	31–60	250	H, K	D12D22
	31–60	250	R	D12DR22
	31–60	600	H, K	D12D62
	31–60	600	R	D12DR62
	31–60	600	J	D12DJ2
	61–100	250	H, K	D12D23 *[3]*
	61–100	600	H, K	D12D63 *[3]*
	61–100	600	J	D12DJ3 *[3]*
	61–100	600	R	D12DR63 *[3]*
100 A	No Fuse			D12E03
	31–60	250	H, K	D12E22 *[3]*
	31–60	600	H, K	D12E62
	61–100	250	H, K	D12E23
	61–100	250	R	D12ER23
	61–100	600	H, K	D12F63
	61–100	600	R	D12FR63
	61–100	600	J	D12EJ3
	101–200	250	H, K	D12F24
	101–200	600	H, K	D12F64
	101–200	600	J	D12FJ4
200 A	No Fuse			D12F04
	61–100	600	H, K	D12F63
	101–200	250	H, K	D12F24
	101–200	250	R	D12FR24
	101–200	600	H, K	D12F64
	101–200	600	R	D12FR64
	101–200	600	J	D12FJ4

Table 15.20: Disconnect Switches (without fuse clips or shorting straps)

600 V—Without Service Entrance Rating						
Starter NEMA Size	Rating (A)	Max. Horsepower Rating *[4]*				Catalog Number
		120 V	200–240 V	480 V	600 V	
0–1	30	5	10	20	25	D10S1
2	60	10	20	40	50	D10S2
3	100	15	30	60	75	D10S3
4	200	25	50	100	100	D10S4

600 V—With Service Entrance Rating						
Starter NEMA Size	Rating (A)	Max. Horsepower Rating *[4]*				Catalog Number
		120 V	200–240 V	480 V	600 V	
0–1	30	5	10	20	25	D10S1H
2	60	10	20	40	50	D10S2H
3	100	15	30	60	75	D10S3H
4	200	25	50	100	100	D10S4H

Table 15.21: Rotary Handle Operator Kits and Shafts

Kits include: Handle, Shaft, and Actuator NEMA Type 1, 3, 3R, 4, and 12			
Description	Rating (A)	Enclosure Interior Depth (in.)	Catalog Number
Complete Kit with Handle, Shaft, and Actuator	30, 60, 100, 200	5–6	D11SF4
		6–10	D11SF10
		10–16	D11SF16
Shaft only		6	D11SH10 *[3]*
		12	D11SH16

Table 15.22: Auxiliary Electrical Interlock(for mounting on a 30–200 A disconnect switch) *[5]*

Block Description (with switch contacts open)	Catalog Number
1 N.O.	D11N0 *[3]*
1 N.C.	D11NC
1 N.O. and 1 N.C.	D11N0C
2 N.O.	D11N00 *[3]*
2 N.O. and 2 N.C.	D11N0C2

Table 15.23: Interrupting and Withstandability Ratings

Rating (A)	Interrupting Rating Amperes Symmetrical 600 Vac, 3Ø	Withstandability I²T (Amperes² seconds)
30	1,200	0.38×10^6
60	1,800	1.28×10^6
100	2.000	2.62×10^6
200	3,600	5.25×10^6

NOTE: These switches are for motor circuit applications.

Table 15.24: Switch Dimensions (in.)

Rating (A)	Length		Width	Mounting Hole Dimensions							Depth	
	A	B	C	D	E	F	G	H	I	J	K *[6]*	I *[7]*
30	7-5/16	4-15/32	5-7/8	3-15/32	6	3-15/32	1-7/8	13/32	5-7/16	3-1/4	4-3/32	4-11/32
60	7-5/16	4-15/32	5-7/8	3-15/32	6	3-15/32	1-7/8	13/32	5-7/16	3-1/4	4-11/32	4-11/32
100	9-27/32	5-11/32	8-3/16	4-5/8	5-13/16	3-13/16	2-11/16	51/64	7-5/16	4-3/16	5-23/32	4-27/32
200	12-3/16	7-7/32	8-3/16	4-5/8	5-13/16	3-13/16	2-11/16	51/64	7-5/16	4-3/16	5-23/32	4-27/32

[1] One conductor per lug.
[2] Continuous current should not exceed switch rating (size). Fuse clip kits should be sized to accommodate inrush.
[3] Obsolete.
[4] Nonfused ratings.
[5] One block per switch.
[6] Maximum depth with largest fuse.
[7] Depth including insulating barrier on service entrance switches.

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Type L Circuit Breaker Mechanisms

Type L door-mounted, variable-depth operating mechanisms feature heavy duty, all metal construction with trip indication. All can be padlocked in the Off position when the enclosure door is open. Further, the handle assemblies can be locked Off with up to three padlocks, which also locks the enclosure when the door is closed. (The 3" handle accepts one padlock.) Complete kits are rated for NEMA Type 1, 3R, and 12 enclosures. They include a handle assembly, operating mechanism, and shaft assembly.

Table 15.25: Electrical Interlock Kits—Class 9999

[1]

Description	Class	Type
Single-Pole, Double-Throw	9999	R47
Double-Pole, Double-Throw	9999	R48

Table 15.26: Complete Kits

For Use With Circuit Breakers (Not Included in the Complete Kit)			Operating Mechanism Standard 6 in. Handle				Operating Mechanism Short 3 in. Handle	
			Standard Shaft Kit		Long Shaft Kit		Long Shaft Kit	
Circuit Breaker or Interrupter Type	No. of Poles	Frame Size (A)	Type	Mounting Depth *[2]* Range	Type	Mounting Depth *[2]* Range	Type	Mounting Depth *[2]* Range
GJL	3	75, 100	LG1	5-1/2 to 10-1/4	LG4	5-1/2 to 20-7/8	LG3	5-1/2 to 20-7/8
FAL, FCL, FHL	2–3	100	LN1	5-1/2 to 10-7/16	LN4	5-1/2 to 21	LN3	5-1/2 to 21
KAL, KCL, KHL	2–3	250	LP1	6-1/4 to 11-3/16	LP4	6-1/4 to 21-3/4	LP3	6-1/4 to 21-3/4
LAL *[3]*, LHL *[3]*, Q4L	2–3	400	LR1	6-5/16 to 10-7/8	LR4	6-5/16 to 21-1/2	LJ3	5-1/2 to 21-3/8
MEL, MXL	2–3	800	LT1 *[4]*	7-3/16 to 11-5/8	LT4 *[4]*	7-3/16 to 22-1/4	Not recommended.	
MAL, MHL	2–3	1200	LT1 *[4]*	7-3/16 to 11-5/8	LT4 *[4]*	7-3/16 to 22-1/4		
NAL, NCL, NEL, NXL	2–3	1200	LX1 *[4]*	8-1/4 to 12-3/4	LX4 *[4]*	8-1/4 to 23-3/8		

Table 15.27: Component Parts

Use With			Handle Assemblies NEMA 1, 3R, 12		Operating Mechanism (Lockout Included)	Standard Shaft (Support Bracket Not Required)		Long Shaft (Support Bracket Included)	
			3 in.	Standard					
Circuit Breaker or Interrupter Type	No. of Poles	Frame Size (A)	Type	Type	Type	Mounting Depth *[2]* Range	Type	Mounting Depth *[2]* Range	Type
GJL	3	75, 100	LH3	LH6	LG7	5-1/2 to 10-7/16	LS8	5-1/2 to 21	LS13
FAL, FCL, FHL	2–3	100	LH3	LH6	LF1	5-1/2 to 10-7/16	LS8	5-1/2 to 21	LS12
KAL, KCL, KHL	2–3	250	LH3	LH6	LK1	6-1/4 to 11-3/16	LS8	6-1/4 to 21-3/4	LS12
LAL *[3]*, LHL *[3]*, Q4L	2–3	400	Not recommended	LH6	LL1	6-5/16 to 10-7/8	LS8	6-5/16 to 21-1/2	LS10
MEL, MXL	2–3	800		LH8	LM1	7-3/16 to 11-5/8	LS8	7-3/16 to 22-1/4	LS10
MAL, MHL	2–3	1200		LH8	LM1	7-3/16 to 11-5/8	LS8	7-3/16 to 22-1/4	LS10
NAL, NCL, NEL, NXL	2–3	1200		LH8	LX7	8-1/4 to 12-3/4	LS8	8-1/4 to 23-3/8	LS10

Table 15.28: NEMA Type 4 and 4X Handle Assemblies *[5]*

Use With			Standard Handle Assemblies		3 in. Handle Version	
Circuit Breaker or Interrupter Type	No. of Poles	Frame Size (A)	NEMA 1, 3R, 4, 12 (Painted)	NEMA 1, 3R, 4, 4X, 12 (Chrome Plated)	NEMA 1, 3R, 4, 12 (Painted)	NEMA 1, 3R, 4, 4X, 12 (Chrome Plated)
			Type	Type	Type	Type
GJL	3	75	LH46	LC46	LH43	LC43
FAL, FCL, FHL	2–3	100	LH46	LC46	LH43	LC43
KAL, KCL, KHL	2–3	250	LH46	LC46	LH43	LC43
LAL, LHL, Q4L	2–3	400	LH46	LC46	Not recommended	
MEL, MXL	2–3	800	LH48	LC48		
MAL, MHL	2–3	1000	LH48	LC48		
NAL, NCL, NEL, NXL	2–3	1200	LH48	LC48		

Table 15.29: IEC Style Operating Mechanisms

Circuit Breaker or Interrupter Type	Handle Type 1, 4, 4X, 12		Operating Mechanism (Lockout Included)	Extension Shafts		
				Mounting Depth		Type
	Color	Type	Type	Min.	Max.	
GJL	Red/Yellow	NW3 *[6]*	LG8	6-1/8	10-3/4	NS16
	Black	NW3B		6-1/8	17-7/8	NS336 *[7]*



Operating Mechanism



Operating Mechanism (includes lockout)



3 in. Handle Assembly



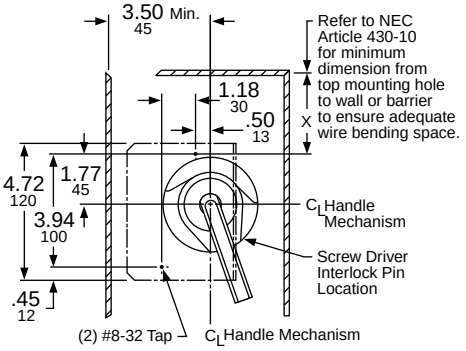
Standard Handle Assembly

[1] Optional accessory for use with 9421L operating mechanisms. Not used with GJL, NAL, NCL, NEL, NXL, NSF, NSJ, PowerPact™ C, D, H, and J circuit breakers; use field-installed circuit breaker interlocks instead.
[2] Mounting depth in inches, measured from the circuit breaker mounting surface (control panel) to the outside of the enclosure door.
[3] These operating mechanisms cannot be used with any LA/LH circuit breakers with an MB or MT suffix.
[4] Types LT1, LT4, LX1, and LX4 include an 8 in. handle rather than a 6 in. handle.
[5] Due to gasketing, NEMA Type 3 and 4 handle assemblies are **not** trip indicating.
[6] Obsolete.
[7] Contains support bracket.

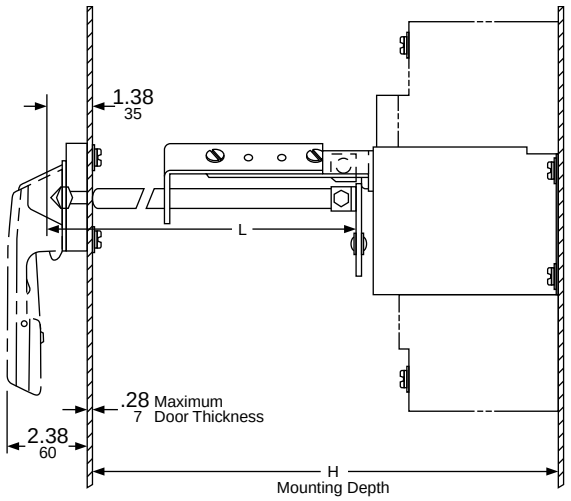
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Panel Drilling, Types G, F, and K

Refer to Table 15.30 for the shaft cutting dimensions.

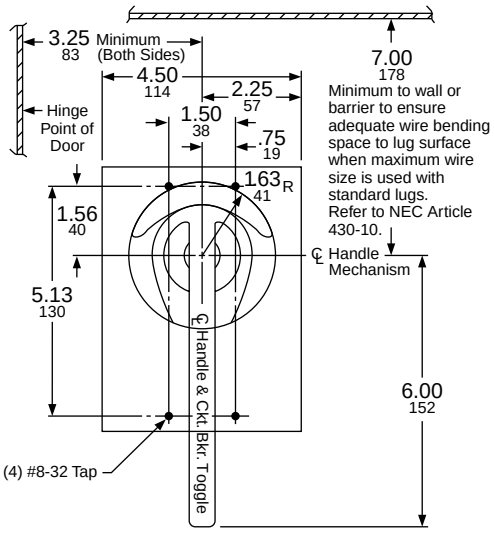


Panel drilling for GJL circuit breaker and operating mechanism

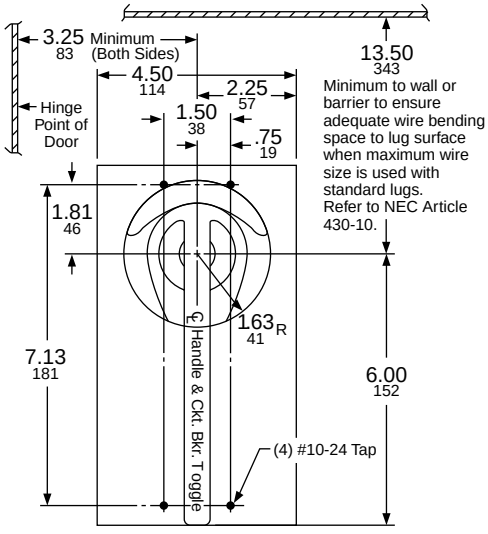


L = Overall shaft length
H = Distance from inside of enclosure door to circuit breaker mounting surface

NOTE: The mounting depth is measured from the circuit breaker mounting surface (control panel) to the outside of the enclosure door.



Panel drilling for FAL, FCL, and FHL circuit breakers and operating mechanisms



Panel drilling for KAL, KCL, and KHL circuit breakers and operating mechanisms

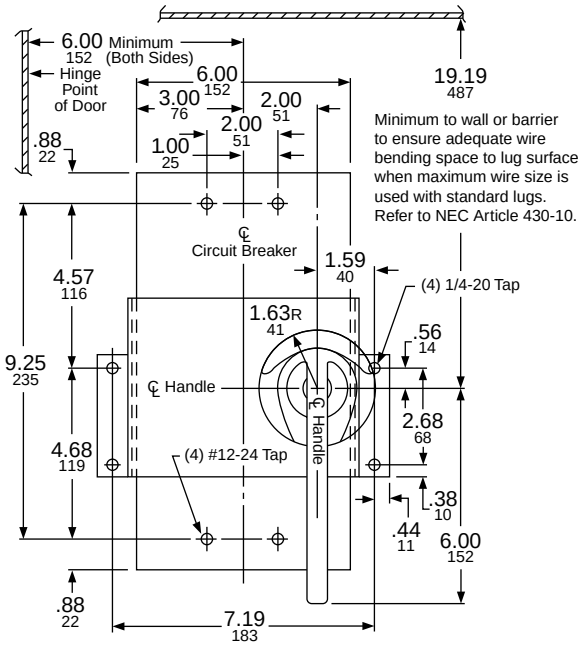
Dimensions: in. / mm

Table 15.30: Shaft Cutting Dimensions, in. (mm)

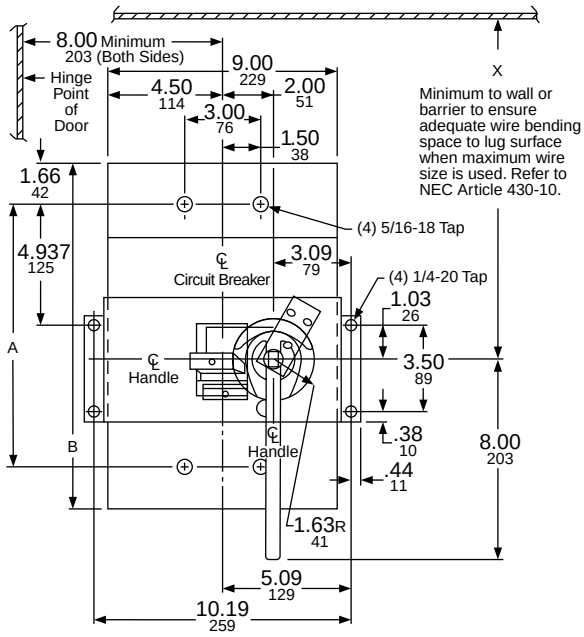
Class	Type	Shaft Length Formula	H = Standard Shaft		H = Long Shaft	
			Min.	Max.	Min.	Max.
9421	LG7, LG1, LG4, LG3	L = H–**2.50** (64)	**5.50** (140)	**10.25** (260)	**5.50** (140)	**20.85** (530)
9421	LF1, LN1, LN3, LN4	L = H–**2.88** (73)	**5.50** (140)	**10.44** (265)	**5.50** (140)	**21.00** (533)
9421	LK1, LP1, LP3, LP4	L = H–**3.63** (92)	**6.25** (159)	**11.19** (284)	**6.25** (159)	**21.75** (552)
9421	LL1, LR1, LR4	L= H–**3.13** (790)	**6.31** (160)	**10.88** (276)	**6.31** (160)	**21.50** (546)
9421	LM1, LT1, LT4	L= H–**4.00** (102)	**7.18** (182)	**11.63** (295)	**7.18** (182)	**22.25** (565)
9421	LX7, LX1, LX4	L= H–**5.17** (131)	**8.25** (210)	**12.75** (324)	**8.25** (210)	**23.38** (594)

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Panel Drilling, Types L, M, and N

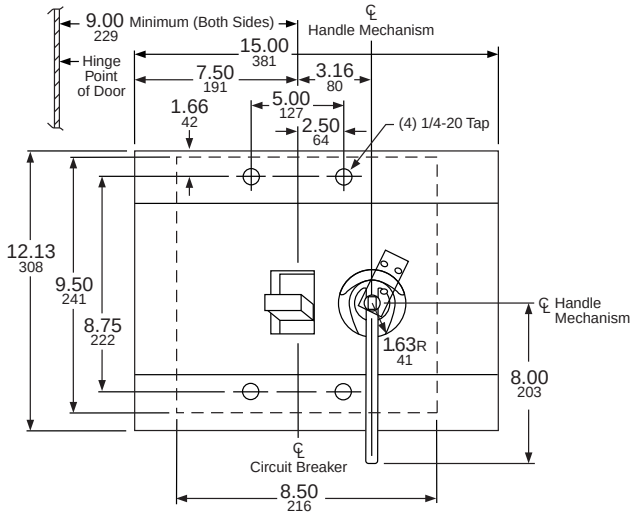


Panel drilling for LAL, LHL, and Q4L circuit breakers and operating mechanisms



Panel drilling for MAL, MEL, MHL, and MXL circuit breakers and operating mechanisms

Circuit Breaker Type	Dimensions = in. (mm)	
	A	B
MAL, MHL	10.69 (272)	14.00 (356)
MEL, MXL	11.47 (291)	14.75 (375)

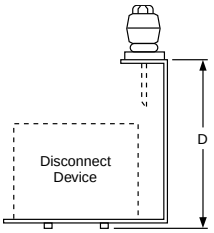


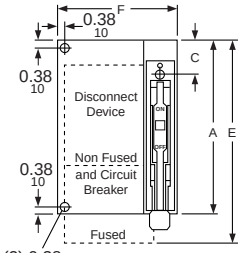
Panel drilling for NAL, NCL, NEL, and NXL circuit breakers and operating mechanisms

Dimensions: $\frac{\text{in.}}{\text{mm}}$

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(For back panel support if necessary.)



Bracket-Mounted Operating Mechanisms for Use With Square D™ Circuit Breakers

The circuit breaker operating mechanisms listed below are shipped with the external operating handle assembled to a bracket. Circuit breakers are not included and must be ordered separately. A trim plate is provided with each kit to prevent any mounting screws from being accessible from the front and also to provide an attractive installation.The operating handle is Type A1. These switches can be used with Class 9423 door closing mechanisms.

Table 15.31: Bracket-Mounted Operating Mechanisms for Use With Square D™ Circuit Breakers

Use With			Operating Mechanism
Circuit Breaker or Interrupter Type	No. of Poles	Frame Size (A)	Right Hand, Flange Mounting
			Cat. No.
FAL, FHL	2–3	100	BN1
KAL, KHL	2–3	250	BP1
LAL *[1]*, LHL *[1]*, Q4L	2–3	400	BR1

NOTE: Some enclosures may not accept the listed bracket-mounted operating mechanisms; contact the enclosure manufacturer.

Table 15.32: Electrical Interlock Kits—Class 9999

Optional accessory for use with circuit breaker operating mechanisms listed to the left and the flexible cable mechanisms listed below, except GJL

Description	Class	Type
Single Pole, Double Throw	9999	R26
Double Pole, Double Throw	9999	R27

NOTE: Not used with GJL; use field installed circuit breaker interlocks.

Table 15.33: Dimensions, in. (mm)

Type	A	C	D	Min. Enclosure Depth *[2]* in. (mm)	F
BG1, BN1	8.75 (222)	1.13 (29)	6.50 (165)	8.00 (203)	7.13 (181)
BP1	9.13 (232)				7.38 (187)

NOTE: Back panel support is recommended for Types TFB1, 2, and 3. Other devices may also require support if the flange is not sufficiently rigid.

Table 15.34: Class 9422—Flexible Cable Mechanisms for Use with Square D Circuit Breakers

For use with Square D circuit breakers and Class 9422 A handle operators. Especially designed for tall, deep enclosures where placement flexibility is required. See Digest 177, Section 8 for dimensions.

Circuit Breaker Type	No. of Poles	Frame Size (A)	Cable Mechanism		Cable Mechanisms with A1 Handle For Types 1, 3, 3R, 4, 12
			Cable Length	Catalog No.	Catalog No.
GJL	3	100	36 in.	CGJ30	CGJ31
			48 in.	CGJ40	CGJ41
			60 in.	CGJ50	CGJ51
			120 in.	CGJ10	CGJ11 *[3]*
FAL, FHL	2, 3	100	36 in.	CFA30	CFA31
			60 in.	CFA50	CFA51
			120 in.	CFA10	CFA11
KAL, KHL	2, 3	250	36 in.	CKA30	CKA31
			60 in.	CKA50	CKA51
			120 in.	CKA10	CKA11
LAL *[4]*, LHL *[4]*, Q4L	2, 3	400	36 in.	CLA30	CLA31
			60 in.	CLA50	CLA51
			120 in.	CLA10 *[3]*	CLA11

Table 15.35: Class 9999 Auxiliary Contact Kits for Disconnect Switches and Circuit Breakers

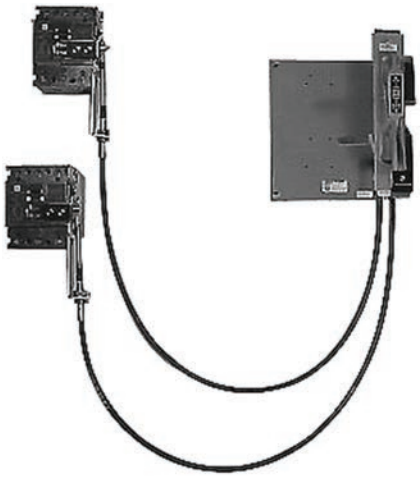
Class	Type	SPDT	DPDT
		Type	Type
Disconnect Switches			
9422	TF	R8	R9
Circuit Breaker Operating Mechanisms			
9421	LF, LK, LL, LM, LN, LP, LR, LT	R47	R48
9422	RM, RN, RP, RR, RT	R26	R27
9422	CFA, CKA, CLA, CSF	R26	R27

NOTE: No external auxiliary contacts are available for the following circuit breakers:
GJL circuit breakers must use internal auxiliary contacts, catalog number AAC.
PowerPact D circuit breakers must use internal auxiliary contacts, catalog number AAC.

NOTE: For additional variations, contact the Customer Care Center (CCC) at 1-888-778-2733.

[1] These operating mechanisms cannot be used with any LA/LH circuit breakers with an MB or MT suffix.
[2] The minimum enclosure depth is greater than Dimension D, since additional space is needed when mounting the mechanism.
[3] Obsolete.
[4] These operating mechanisms cannot be used with any LA/LH circuit breakers with an MB or MT suffix.

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Dual Cable Operating Mechanisms for Square D™ Circuit Breakers

Dual cable operator mechanisms are designed for use with Square D GJL circuit breakers. The cable mechanisms allow for a single handle operator, Class 9422A1, to operate both circuit breakers. The cable mechanism is designed especially for tall, deep enclosures where placement flexibility is required. There are numerous cable arrangements to choose from to accommodate many applications.

Features

- Separate cables for each circuit breaker
- Rugged metal flange handle operator
- Maximized flexibility of circuit breaker placement for existing and new applications
- Control panel can be fed from two separate supply voltages (if required)
- Dual mechanism allows both separate supply voltages to be controlled by a single handle to improve security features

Table 15.36: Dual Cable Operating Mechanisms Selection

Circuit Breaker Type	Cable Length in. / mm (quantity)	Catalog Number	Frame Size (max.)
GJL	36 in. / 914 mm (2)	9422CGJD3	100 A
	48 in. / 1219 mm (2)	9422CGJD4	
	60 in. / 1524 mm (2)	9422CGJD5	
	120 in. / 3048 mm (2)	9422CGJD1 *[1]*	
	36 in. / 914 mm (1) 60 in. / 1524 mm (1)	9422CGJD8 *[1]*	
	60 in. / 1524 mm (1) 120 in. / 3048 mm (1)	9422CGJD9 *[1]*	

Table 15.37: Special Left-hand Mounted Single Cable Operating Mechanisms

Circuit Breaker Type	Cable Length in. / mm (quantity)	Catalog Number	Frame Size (max.)
FAL	120 in. / 3048 mm (1)	9422CFAL10	100 A
	36 in. / 914 mm (1)	9422CFAL30	
	60 in. / 1524 mm (1)	9422CFAL50	

[1] Obsolete.

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Variable-Depth Mechanisms

Designed for installation in custom built control enclosures where main or branch circuit protective devices are required. All circuit breaker operating mechanisms are suitable for either right- or left-hand flange mounting, convertible on the job.

Table 15.38: Variable-Depth Mechanisms for Use with Square D™ Circuit Breakers and Schneider Electric™ (formerly Merlin Gerin™) Circuit Breakers

Use With				Operating Mechanism		
				Operating Mechanism Only—Does Not Include Handle Mechanism	Operating Mechanism and Handle Mechanism	
Circuit Breaker Frame Size	No. of Poles	Frame Size A	Variable-Depth Mounting. Range *[1]* (in.)		Includes Type A1 Handle Mechanism	Includes Type A2 Handle Mechanism
				Type	Type	Type
Square D Circuit Breakers						
GJL	3	100	6.00–17.75	RG1	ARG11	ARG21
FAL, FHL	2–3	100	5.38–17.75	RN1	ARN11	ARN21
KAL, KHL	2–3	250	6.38–17.88	RP1	ARP11	ARP21
LAL *[2]*, LHL *[2]*, Q4L	2–3	400	7.44–18.25	RR1	ARR11	ARR21
MEL, MXL	2–3	800	9.00–18.38	RT1	ART11	ART21
MAL, MHL	2–3	1200	9.00–18.38	RT1	ART11	ART21
NAL, NCL, NEL, NXL	2–3	1200	11.00–18.37	RX1	—	—

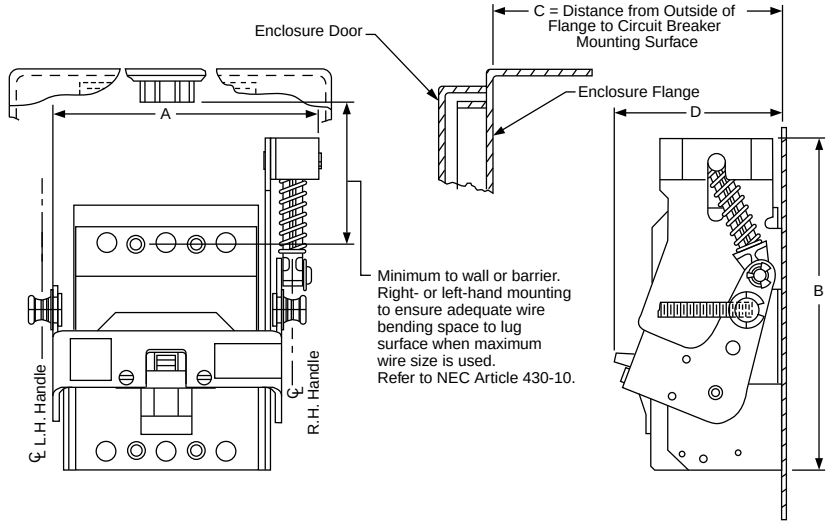


Table 15.39: Electrical Interlocks—Class 9999

Description	Class	Type
Single Pole, Double Throw	9999	R26 *[3]*
Double Pole, Double Throw	9999	R27 *[3]*

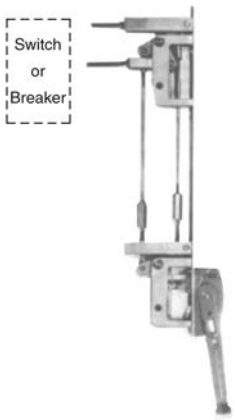
Table 15.40: Dimensions

Circuit Breaker Frame Size	Type	Width (A)		Height (B)		Distance to Enclosure Flange *[4]* (C)				Bracket Depth (D)	
						Minimum		Maximum			
		in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
GJL	RG1	5.00	127	4.75	121	6.00	152	17.75	451	4.00	102
FAL, FHL	RN1	6.75	171	8.50	216	5.51	140	17.75	451	4.26	108
KAL, KHL	RP1	7.13	181	10.13	257	6.51	165	17.88	454	4.94	125
LAL *[2]*, LHL *[2]*, Q4L	RR1	10.19	259	11.00	279	7.44	189	18.25	464	6.00	152
MEL, MXL	RT1	13.38	340	14.00	356	9.00	229	18.38	467	9.69	246
MAL, MHL*[5]*	RT1	13.38	340	14.00	356	9.00	229	18.38	467	9.69	246
NAL, NCL, NEL, NXL	RX1	19.63	499	13.50	343	11.00	279	18.37	467	9.00	229



[1] Class 9422 Type R2 extends the mounting depth by 7 in.
[2] These operating mechanisms cannot be used with any LA/LH circuit breakers with an MB or MT suffix.
[3] Not for use with the GJL operating mechanism.
[4] 9422R2 extends the dimension by 7 in. Two are required.
[5] The minimum mounting depth when using MAL or MHL circuit breakers can be decreased to 7.63 in. by using the Class 9422 Type RT1B conversion kit.

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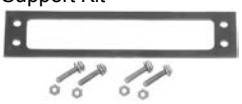
Remote operation shown (the handle mechanism is not included in the kit)



Air valve interlock mounted on the enclosure



Channel/Flange Support Kit



Alternate Mounting Kit



Auxiliary Lock Plate

Remote or Dual Adapter Kit

For the remote or dual operation of GJL, FAL, FHL, KAL, KHL, LAL, LHL, Q4L, MAL, MHL, MEL, and MXL circuit breakers.

Remote Operation—permits mounting the Class 9422 Type A9 or A10 handle mechanism at a lower level than the disconnect device it controls. This arrangement is often required where the disconnect device is mounted too high for personnel to easily reach a conventional operator.

Dual Operation—permits controlling two disconnect devices, one in line with, and one remote from, a single Class 9422 Type A9 or A10 handle mechanism.

NOTE: A Class 9422 Type A9 or A10 handle (see Digest 177, Section 8) and the preferred mounting method **must** be used.

Table 15.41: Disconnect Device

Disconnect Device	Enclosure Mounting Depth		Type
	Min.	Max.	
Circuit Breaker			
GJL	10.50	19.50	D2
FAL, FHL	10.66	19.50	
KAL, KHL	11.13	19.50	
LAL, LHL, Q4L	12.13	19.88	
MAL, MHL,MEL, MXL	13.75	20.25	

Table 15.42: Air Valve Interlock

NOTE: Air valve interlocks only accept the specific three-way air valves, manufactured by Parker, listed in the table below.

Parker Valve Model Number *[6]*		Class 9422 Air Valve Interlock
Air Valve Size	Knob Operated	Type
0.50 in. NPT (13)	M04841885	G1
	M08541848	
0.75 in. NPT (19)	M04861885	G2
	M08561848	
1.00 in. NPT (25)	M00080004	G1

Table 15.43: Other Accessories

Accessory	Description	Class	Type
Channel/Flange Support Kit	Auxiliary kit recommended for use with 30 A and 60 A disconnect switches and FAL, FCL, FHL, KAL KHL, NSF, and NSJ circuit breaker mechanisms when these devices are to be mounted on the center channel of a multi-door enclosure or when extra rigidity for the flange is required. Supplied as standard with 100 A and 200 A disconnect switches and LAL, LHL, Q4L, MAL, MHL, MEL, and MXL circuit breaker mechanisms.	9422	C1

[6] **Prices do not include air valves or the handle mechanism.** For more information on the air valves listed, contact Parker at c-parker@parker.com, or call 1-800-272-7537.

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California Proposition 65 Message

⚠ **WARNING:** Some of the products listed in this document can expose you to chemicals which are known to the State of California to cause cancer, birth defects, or other reproductive harm.

For more information, go to https://www.p65warnings.ca.gov/.

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