

30 mA Ground Fault (Earth Leakage) Modules



Clockwise from Left: JG, LG, EG MCCBs Shown with Ground Fault (Earth Leakage) Modules

Product Description

Eaton offers a 3- and 4-pole 30 mA ground fault (earth leakage) protection module for EG, JG and LG breakers. The module does not restrict the use of other breaker accessories. UL-listed modules are available for JG and LG MCCBs. The IEC-rated EG module is side mounted for circuits up to 125 amperes, while the JG and LG modules are both bottom mounted for circuits up to 160 and 250 amperes (JG), or 400 and 630 amperes for the LG.

The module is completely self-contained since the current sensor, relay and power supply are located inside the product. Current pickup settings are selectable from 0.03 – 10 amperes for all IEC-rated modules and JG UL-listed module, and 0.03 – 30 amperes for the LG UL-listed modules. Time delays are also selectable from Instantaneous – 1.0 seconds for 0.10 ampere settings and above. A current pickup setting of 0.03 amperes defaults to an Instantaneous time setting regardless of the time dial's position. Two alarm contacts come as standard: a 50% pre-trip and a 100% after trip, both based only on earth leakage current levels.

Product Selection

Table 45-60. EG-Frame Earth Leakage Modules, IEC (Side Mounted, 230 – 415 Vac, 50/60 Hz)

Amperes	Poles	Catalog Number	Price U.S. \$
125	3	ELESE3125W	
125	4	ELESE4125W	

Table 45-61. JG-Frame Ground Fault Modules, UL-Rated (Bottom Mounted, 120 – 480 Vac, 50/60 Hz)

Amperes	Poles	Catalog Number	Price U.S. \$
150	3	ELJBN3150W	
150	4	ELJBN4150W	
250	3	ELJBN3250W	
250	4	ELJBN4250W	

Table 45-62. JG-Frame Earth Leakage Modules, IEC (Bottom Mounted, 230 – 415 Vac, 50/60 Hz)

Amperes	Poles	Catalog Number	Price U.S. \$
160	3	ELJBE3160W	
160	4	ELJBE4160W	
250	3	ELJBE3250W	
250	4	ELJBE4250W	

Table 45-63. LG-Frame Ground Fault Modules, UL-Rated (Bottom Mounted, 120 – 480 Vac, 50/60 Hz)

Amperes	Poles	Catalog Number	Price U.S. \$
400	3	ELLBN3400W	
400	4	ELLBN4400W	
600	3	ELLBN3600W	
600	4	ELLBN4600W	

Table 45-64. LG-Frame Earth Leakage Modules, IEC (Bottom Mounted, 230 – 415 Vac, 50/60 Hz)

Amperes	Poles	Catalog Number	Price U.S. \$
400	3	ELLBE3400W	
400	4	ELLBE4400W	
630	3	ELLBE3630W	
630	4	ELLBE4630W	

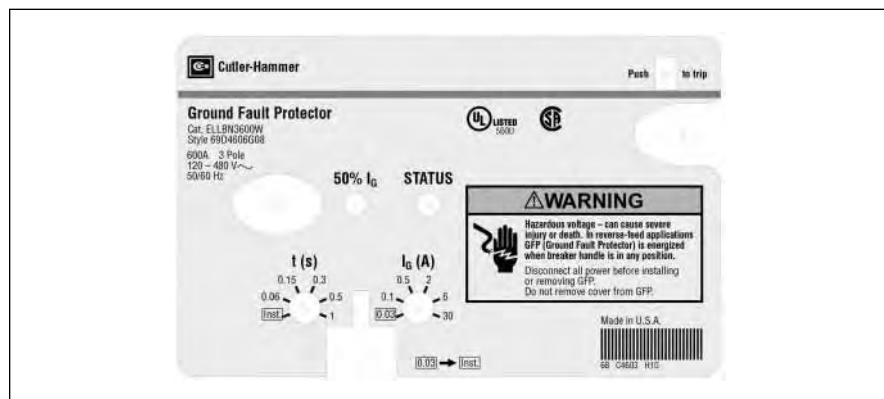


Figure 45-4. UL-Rated LG-Frame Earth Leakage Module Faceplate

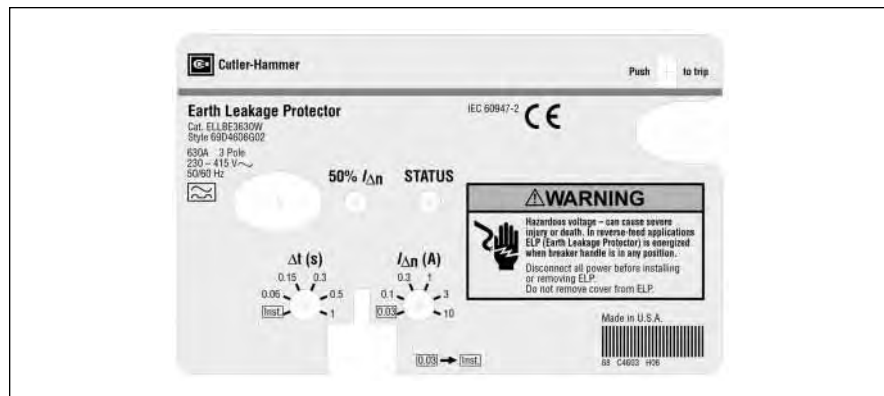


Figure 45-5. IEC-Rated LG-Frame Earth Leakage Module Faceplate

Special Features and Accessories

Internal Accessories

Alarm Lockout

The alarm switches operate when the circuit breaker is tripped by a short circuit or overcurrent, but also when it is tripped by a shunt trip or under-voltage release.

Auxiliary Switches

Auxiliary switches are used for signaling and control purposes. The various functions of the auxiliary switches (changeover) are shown in **Figure 45-7**.

Shunt Trips

The shunt trip is used for remote tripping.

The coil of the shunt trip is rated only for short-time operation.

It is not permissible with the circuit breaker open to apply a continuous opening command to the shunt trip in order to prevent the breaker from closing. This means that interlocking circuits with continuous commands may not be set up with shunt trips.

Undervoltage Releases

The circuit breaker cannot be closed until the undervoltage release is energized. If the release is not energized, the circuit breaker can only perform an idle switching operation.

Frequent idle switching actions should be avoided as they shorten the endurance of the circuit breaker.

Accessory Configurations for EG – LG Circuit Breakers

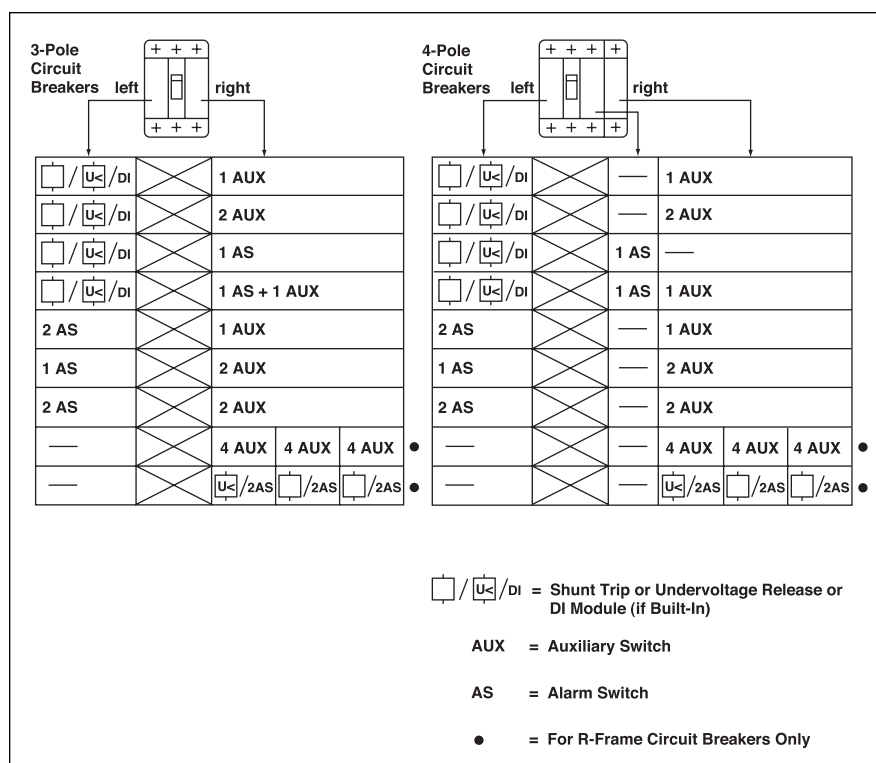


Figure 45-6. Internal Accessory Configurations










Position of the Toggle Handle Drive (Equivalently Applicable for Rotary Drives)	Position of the Auxiliary Switch	Position of the Alarm Switch
 <p>OFF RESET</p>		
 <p>ON</p>		
 <p>Tripped</p>		

Figure 45-7. Contact Making by the Auxiliary and Alarm Switches as a Function of the Switching Position of the Circuit Breaker

Special Features and Accessories

Special Calibration

Special non-UL listed calibrations are available for certain ambient temperatures other than 40°C and for frequencies other than 50/60 Hz or dc. Reduced interrupting ratings will apply for 400 Hz applications.

50°C Calibration

Note: Breakers equipped with electronic trip units can operate reliably in ambient temperatures of 50°C. Add suffix "V3" to NG MCCBs to remove standard 40°C labeling.

Add suffix "V" to catalog number for complete thermal magnetic breaker when ordering listed ampere ratings for breakers to be used in 50°C ambients. 50°C ambient MCCBs are not UL listed.

Contact Eaton for availability.

Moisture-Fungus Treatment

All Cutler-Hammer Circuit Breaker cases are molded from glass-polyester which does not support the growth of fungus. Any parts which are susceptible to the growth of fungus will require special treatment.

Order by description.

Table 45-65. Calibrations and Treatment

Description	Frame					
	EG	Price U.S. \$	JG	Price U.S. \$	LG	Price U.S. \$
Special Calibration	✓		✓		✓	
Moisture-Fungus Treatment	✓		✓		✓	

Table 45-66. External Accessories and Test Kit

Description	Fit Type	Frame					
		EG	Price U.S. \$	JG	Price U.S. \$	LG	Price U.S. \$

External Accessories

Non-Padlockable Handle Block	Field	EFHB		—		—	
Padlockable Handle Block	Field	EFPHB		FJPHB		LBHP	
Padlockable Handle Block Off-Only	Field	EFPHBOFF		FJPHBOFF		LBHPOFF	
Padlockable Handle Lock Hasp	Field	EFPHL		FJPHL		LPHL	
Padlockable Handle Lock Hasp Off-Only	Field	EFPHLOFF		FJPHLOFF		LPHLOFF	
Kirk Key Interlock Kit ①	Field	—		KYKFJ		KYKL	
Castell Key Interlock Kit ②	Field	—		CYKFJ		CYKL	
Slide Bar Interlock ③	Field	EFSBI		FJSBI		LGSB1	
Walking Beam Interlock ③	3-Pole	EG3WBI		JG3WBI		LG3WBI	
	4-Pole	EG4WBI		JG4WBI		LG4WBI	
Electrical Operator ④	120 Vac	EOPEG240C		EOPFJ240C		EOPLG240C	
	240 Vac	EOPEG240C		EOPFJ240C		EOPLG240C	
	24 Vdc	EOPEG48D		EOPFJ24D		EOPLG24D	
	48 Vdc	EOPEG48D		EOPFJ48D		EOPLG48D	
	125 Vdc	EOPEG240C		EOPFJ240C		EOPLG240C	
Plug-In Adapters	3-Pole	PAD3E		PAD3J		PAD3L	
	4-Pole	PAD4E		PAD4J		PAD4L	
Rear Connecting Studs	Field	⑤		⑤		3P-LRCS3WK 4P-LRCS4WK	

Test Kit

Electronic Portable Test Kit	120 V 230 V	N/A N/A		MTST120V MTST230V		MTST120V MTST230V	
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① Provision only.

② Castell bolt mounting hole must be 10 mm.

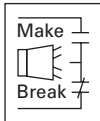
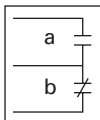
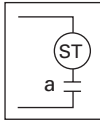
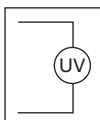
③ Requires two breakers.

④ Contact Eaton for availability of operators for EG- and NG-Frames before December 2004.

⑤ Contact Eaton for catalog numbers.

Accessories

Table 45-67. Accessories

Description		Pole Location	Frame	
			EG, JG & LG	Price U.S. \$
Field Fit Kit Catalog Numbers				
<div>Alarm Lockout</div> <div></div>	Make/Break	Left	—	
		Right	ALM1M1BEPK ①	
	2 Make/2 Break	Left	—	
		Right	ALM2M2BEPK ②	
<div>Auxiliary Switch</div> <div></div>	1A, 1B	Left	—	
		Right	AUX1A1BPK	
	2A, 2B	Left	—	
		Right	AUX2A2BPK	
	3A, 3B	Left	—	
		Right	—	
	4A, 4B	Left	—	
		Right	—	
	Auxiliary Switch / Alarm Lockout	Left	—	
		Right	AUXALRMEPK ③	
<div>Shunt Trip — Standard</div> <div></div>	120 Vac	Left	SNT120CPK ④	
		Right	—	
	240 Vac	Left	SNT120CPK ④	
		Right	—	
	24 Vdc	Left	SNT060CPK ⑤	
		Right	—	
	48 Vdc	Left	SNT060CPK ⑤	
		Right	—	
	380 – 600 Vac	Left	SNT480CPK ⑥	
		Right	—	
220 – 250 Vdc or 380 – 440 Vac	—	—		
	480 – 600 Vac	—	—	
Shunt Trip — Low Energy	Left	—		
	Right	—		
<div>Undervoltage Release Mechanism</div> <div></div>	110 – 127 Vac	Left	UVR120APK	
		Right	—	
	208 – 240 Vac	Left	UVR240APK	
		Right	—	
	24 Vdc, Vac	Left	UVR024CPK	
		Right	—	
	48 – 60 Vdc	Left	UVR048DPK	
		Right	—	
	12 Vdc, Vac	Left	UVR012CPK	
		Right	—	
	48 – 60 Vdc	Left	UVR048APK	
		Right	—	
	120 Vdc	Left	UVR125DPK	
		Right	—	
	220 – 250 Vdc	Left	UVR250DPK	
		Right	—	
	380 – 500 Vac	Left	UVR480APK	
		Right	—	
	525 – 600 Vac	Left	UVR600APK	
		Right	—	
12 Vdc	Left	—		
	Right	—		
12 Vac	Left	—		
	Right	—		

① Part number for JG and LG is ALM1M1BJPK.

② Part number for JG and LG is ALM2M2BJPK.

③ Part number for JG and LG is AUXALRMJPK.

④ 110 – 125 Vdc, 50/60 Hz.

⑤ 12 – 60 Vdc, 50/60 Hz.

⑥ 380 – 600 Vdc, 50/60 Hz.

Discount Symbol **CB-2**

Plug-in Blocks

Plug-in adapters simplify installation and front removal of circuit breakers. Plug-ins are available for rear connection applications on 3- and 4-pole circuit breakers. Trip on drawout interlock kits are included. Stabs for EG, JG and LG plug-ins rotate 90° for flexible installation. Use terminal shields for IP30 protection.



LG Breaker with Plug-in Block

Product Selection

Table 45-68. Plug-in Blocks

Breaker Frame	Poles	Catalog Number	Price U.S. \$
EG-, JG- and LG-Frame Plug-in Blocks			
EG	3	PAD3E	
EG	4	PAD4E	
JG	3	PAD3J	
JG	4	PAD4J	
LG	3	PAD3L	
LG	4	PAD4L	

Trip-on Drawout Interlock Kit ①

EG	3, 4	PIILEG	
JG	3, 4	PIILJG	
LG	3, 4	PIILLG	

Terminal Shields IP30

EG	3	EFTS3K	
EG	4	EFTS4K	
JG	3	FJTS3K	
JG	4	FJTS4K	
LG	3	LTS3K	
LG	4	LTS4K	

① Included with plug-in block. Trips the breaker when breaker is removed from plug-in block.

Drawout Cassette



Drawout Cassette



JG and LG Drawout Cassettes

The Drawout Cassette is available for use with JG, LG and NG, 3- and 4-pole breakers. Also available are drawout cassettes for use with the standard 3-pole 65 and 100 kA/480 Vac, 1600 ampere and 2000 ampere RG circuit breakers. The cassettes consist of two separate components: the movable mechanism, which attaches to the breaker, and the stationary mechanism, which houses in the cassette. The stationary mechanism is shipped separately for the RG frame breakers. For the JG, LG and NG drawout cassettes, all necessary parts for installation are included in the one catalog number.

Features of the drawout cassettes for the JG, LG and NG include:

- **Trip on drawout** — Breaker will trip if it is in the ON position when withdrawn from the cassette.
- **Secondary Terminal Block** — The drawout cassettes include a secondary terminal block for easier access when wiring low voltage accessories, including shunts and undervoltage releases.

The drawout mechanism has three primary positions:

- **Connected** — The breaker is fully connected to the primary stabs and secondary contacts.
- **Disconnected** — Both the primary stabs and the secondary contacts are disconnected.
- **Withdraw** — The breaker can be removed from the cassette.

Table 45-69. JG, LG and NG Drawout Cassettes

Breaker Frame	Poles	Catalog Number	Price U.S. \$
JG	3	JG3DOM	
	4	JG4DOM	
LG	3	LG3DOM	
	4	LG4DOM	

Handle Mechanisms

Handle Mechanisms Overview

Handle mechanisms are used to operate molded case circuit breakers, molded case switches and motor circuit protectors. They are available in three basic configurations — Flange Mounted, Through-the-Door and Direct (Close-Coupled) — providing safe, dependable operation and ease of installation.

Flange Mounted

■ Flex Shaft

Through-the-Door

■ Universal Rotary

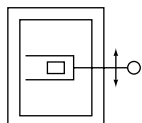
Direct (Close Coupled)

■ Universal Direct

■ Euro IEC

Handle mechanisms are typically used on enclosed circuit breakers, control panels and motor control centers in many different applications. Eaton Electrical has a handle mechanism for virtually any need.

Flange Mounted Handle Mechanisms



The Flex Shaft™

Flange Mounted handle mechanisms mount on the flange of an enclosure door. The Flex Shaft is an extra heavy-duty mechanism that includes a flexible shaft in various lengths, 3 feet (0.9 m) through 10 feet (3 m) for use with various size enclosures.

The Flex Shaft handle will accept up to three padlock shackles, each with a maximum diameter of 3/8 inch (9.5 mm). Can be used with NEMA 12 fabricated enclosures. An optional handle is available for Flex Shaft that is suitable for use with NEMA 4 environments.

Flex Shaft comes preset from the factory, requiring only minor field adjustments on installation, which takes about 10 minutes — a significant time savings compared to installation of other types of flange handle mechanisms. The Flex Shaft mechanism also takes up less interior enclosure space than competitive designs and the handle fits standard flange cutouts. Flex Shaft handle can be remotely mounted from breaker, where an operator can use it by “funneling” the cable through conduit.

Flex Shaft is UL listed under File E64893 and meets CSA requirements.

Flex Shaft Ordering Information

Table 45-70. Flex Shaft Ordering Information

Breaker Frame	Flexible Shaft Length in Feet (m)							
	Catalog Number							
	3 (.9)	4 (1.2)	5 (1.3)	6 (1.8)	7 (2.1)	8 (2.4)	9 (2.7)	10 (3.1)
EG	EHMFS03	EHMFS04	EHMFS05	EHMFS06	EHMFS07	EHMFS08	EHMFS09	EHMFS10
JG	JHMFS03	JHMFS04	JHMFS05	JHMFS06	JHMFS07	JHMFS08	JHMFS09	JHMFS10
LG	—	LHMFS04	—	—	LHMFS07	—	—	LHMFS10

Note: Add Suffix L to the complete Catalog Number for 6-inch (152.4 mm) handle.

Note: 3-Pole only for EG, 3 and 4 Pole for JG and LG.

Flex Shaft Accessories (E- through R-Frame)

Table 45-71. NEMA 12 Safety Door Hardware for Flex Shaft ①

Handle Length in Inches (mm)	Catalog Number ②	Price U.S. \$
4.00 (101.6)	C361KJ4	
6.00 (152.4)	C361KJ6	
Roller Latch ③	C361KR	

① Customer: Consult with box manufacturer for correct door hardware and any adapters required for assembly.

② The 1/4-inch x 1/2-inch (6.35 x 12.7 mm) standard mill rectangular locking bar is not supplied with these kits.

③ Third roller latch for use with 4- or 6-inch (101.6 or 152.4 mm) handle when 3 point latching is required.

Table 45-72. NEMA — IP Crossover

NEMA Type	IP Type
1	IP20
3R	IP55
12	IP54
4/4X	IP66

Note: NEMA 4X handle mechanisms are available. Add Suffix X to the complete Catalog Number.

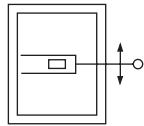
Original narrow handle design (No C Suffix) is available. Remove C from Catalog Number.

Note: When selecting the length of shaft, ensure minimum bending radius of 4 inches (101.6 mm) is maintained to operate properly.

The standard method of shipment includes the mechanism preset at the factory; however, minor field adjustments may be required.

Handle Mechanisms

Through-the-Door Handle Mechanisms



Universal Rotary

The Cutler-Hammer Universal Rotary is suitable for use with NEMA 12 enclosure types. An optional NEMA 4/4X handle mechanism is also available. All rotary handle mechanisms include a handle "Lock Off," to prevent turning the breaker ON while in the OFF position. All Rotary handles indicate ON/OFF/Tripped/Reset positions, however, Universal Rotary has the added feature of international markings for ON (I) and OFF (O). The Universal Rotary is made of molded material. Inside handle is lockable.

The Universal Rotary mechanisms for EG, JG and LG MCCBs can be operated by hand with the door open or "locked off" to prevent operation with the door open.

4/4X Handle Mechanism



EG-Frame



JG & LG-Frames

Table 45-73. Universal Rotary Ordering Information

Shaft Length in Inches (mm)	Handle Color	NEMA Rating	Complete Catalog Number ①	Price U.S. \$
EG-Frame				
6.00 (152.4)	Black	1, 3R, 12	EHMVD06B	
12.00 (304.8)	Black	1, 3R, 12	EHMVD12B	
24.00 (609.6)	Black	1, 3R, 12	EHMVD24B	
6.00 (152.4)	Red	1, 3R, 12	EHMVD06R	
12.00 (304.8)	Red	1, 3R, 12	EHMVD12R	
24.00 (609.6)	Red	1, 3R, 12	EHMVD24R	
6.00 (152.4)	Black	4, 4X	EHMVD06BX	
12.00 (304.8)	Black	4, 4X	EHMVD12BX	
24.00 (609.6)	Black	4, 4X	EHMVD24BX	
6.00 (152.4)	Red	4, 4X	EHMVD06RX	
12.00 (304.8)	Red	4, 4X	EHMVD12RX	
24.00 (609.6)	Red	4, 4X	EHMVD24RX	
JG-Frame				
6.00 (152.4)	Black	1, 3R, 12	FJHMVD06B	
12.00 (304.8)	Black	1, 3R, 12	FJHMVD12B	
24.00 (609.6)	Black	1, 3R, 12	FJHMVD24B	
6.00 (152.4)	Red	1, 3R, 12	FJHMVD06R	
12.00 (304.8)	Red	1, 3R, 12	FJHMVD12R	
24.00 (609.6)	Red	1, 3R, 12	FJHMVD24R	
6.00 (152.4)	Black	4, 4X	FJMVD06BX	
12.00 (304.8)	Black	4, 4X	FJMVD12BX	
24.00 (609.6)	Black	4, 4X	FJMVD24BX	
6.00 (152.4)	Red	4, 4X	FJMVD06RX	
12.00 (304.8)	Red	4, 4X	FJMVD12RX	
24.00 (609.6)	Red	4, 4X	FJMVD24RX	
LG-Frame				
6.00 (152.4)	Black	1, 3R, 12	KLHMVD06B	
12.00 (304.8)	Black	1, 3R, 12	KLHMVD12B	
24.00 (609.6)	Black	1, 3R, 12	KLHMVD24B	
6.00 (152.4)	Red	1, 3R, 12	KLHMVD06R	
12.00 (304.8)	Red	1, 3R, 12	KLHMVD12R	
24.00 (609.6)	Red	1, 3R, 12	KLHMVD24R	
6.00 (152.4)	Black	4, 4X	KLMVD06BX	
12.00 (304.8)	Black	4, 4X	KLMVD12BX	
24.00 (609.6)	Black	4, 4X	KLMVD24BX	
6.00 (152.4)	Red	4, 4X	KLMVD06RX	
12.00 (304.8)	Red	4, 4X	KLMVD12RX	
24.00 (609.6)	Red	4, 4X	KLMVD24RX	

① Complete catalog number includes handle, mechanism, shaft and mounting hardware.

Handle Mechanisms

Direct (Close-Coupled)
Handle Mechanisms



Universal Direct (EG – LG)

Direct (Close-Coupled) Handle Mechanisms mount directly to the circuit breaker. They are used in shallow enclosures where the standard variable depth Through-the-Door type mechanism is not practical or cannot be used. They are typically for applications where high volume, standardized enclosures are being fabricated.

The Universal Direct handle mechanism is designed exclusively for the new Cutler-Hammer EG, JG and LG circuit breakers. It is available as standard with a door interlock to prevent opening the enclosure while the circuit breaker is in the ON position. It is also available without a door interlock.

The Universal Direct handle mechanism is UL 489 listed, IEC 60947-1/2 and meets CSA requirements.

Table 45-74. Universal Direct Ordering Information

Frame	White Handle Color				Red Handle Color	
	with Interlock	Price U.S. \$	without Interlock	Price U.S. \$	without Interlock	Price U.S. \$
	Catalog Number		Catalog Number		Catalog Number	
EG	EHMCCBI		EHMCCB		EHMCCR	
JG	JHMCCBI		JHMCCB		JHMCCR	
LG	LHMCCBI		LHMCCB		LHMCCR	