

## Series C Internal Accessories



## Contents

<i>Description</i>	<i>Page</i>
Product Overview . . . . .	<b>V4-T2-220</b>
Standards and Certifications . . . . .	<b>V4-T2-221</b>
Quick Reference . . . . .	<b>V4-T2-222</b>
G-Frame (15–100 Amperes) . . . . .	<b>V4-T2-225</b>
F-Frame (10–225 Amperes) . . . . .	<b>V4-T2-239</b>
J-Frame (70–250 Amperes) . . . . .	<b>V4-T2-257</b>
K-Frame (70–400 Amperes) . . . . .	<b>V4-T2-265</b>
L-Frame (125–600 Amperes) . . . . .	<b>V4-T2-289</b>
M-Frame (300–800 Amperes) . . . . .	<b>V4-T2-315</b>
N-Frame (400–1200 Amperes) . . . . .	<b>V4-T2-326</b>
R-Frame (800–2500 Amperes) . . . . .	<b>V4-T2-341</b>
Motor Circuit Protectors (MCP) . . . . .	<b>V4-T2-360</b>
Motor Protection Circuit Breakers (MPCB) . . . . .	<b>V4-T2-371</b>
Type ELC Current Limiter Attachment (Size 0–4) . . . . .	<b>V4-T2-373</b>
Current Limiting Circuit Breaker Module . . . . .	<b>V4-T2-374</b>
Internal Accessories	
Product Selection . . . . .	<b>V4-T2-379</b>
Technical Data and Specifications . . . . .	<b>V4-T2-398</b>
External Accessories . . . . .	<b>V4-T2-410</b>

## Internal Accessories

## Product Overview

**Alarm Switch**

For remote indication of automatic trip operation. Does not function with manual switching; however, it will operate when either a shunt trip or undervoltage release is operated. A “make” contact closes and a “break” contact opens when the alarm/lockout switch operates. The switch automatically resets when the circuit breaker is reset.

**Auxiliary Switch**

The auxiliary switch provides circuit breaker contact status information by monitoring the position of the molded cross bar that contains the moving contact arms. The auxiliary switch is used for remote indication and interlock system verification, and consists of one or two SPDT switches housed in a plug-in module. Each SPDT switch has one “a” and one “b” contact. When the circuit breaker contacts are open, the “a” contact is open and the “b” contact is closed.

**Auxiliary Switch and Alarm Switch Combination**

Each catalog number listed in tables on **Pages V4-T2-382** and **V4-T2-383** includes one auxiliary switch and one alarm switch. In an auxiliary switch ASL switch combination, the auxiliary switch is always mounted on the side of the plug-in module next to the center pole of the circuit breaker.

**Shunt Trip**

The shunt trip provides remote controlled tripping of the circuit breaker. The shunt trip consists of an intermittent rated solenoid with a tripping plunger and a cutoff switch assembled to a plug-in module. When required for ground fault protection applications, certain AC rated shunt trips, as noted in the electrical rating table, are suitable for operation at 55 percent of rated voltage.

Select shunt trip catalog number for the voltage within the indicated voltage range. Shunt trip coils are designed to be applied at specific AC or DC voltages within the voltage range shown. Electrical ratings are also shown on applicable circuit breaker accessory nameplates.

**Low Energy Shunt Trip**

Low energy shunt trip devices are designed to operate from low energy output signals from dedicated current sensors typically applied in ground fault protection schemes. However, with a proper control voltage source, they may be applied in place of conventional trip devices for special applications. Flux paths surrounding permanent magnets used in the shunt trip assembly hold a charged spring poised in readiness to operate the circuit breaker trip mechanism.

When a 100 microfarad capacitor charged to 28 Vdc is discharged through the shunt trip coil, the resultant flux opposes the permanent magnet flux field, which releases the stored energy in the spring to trip the circuit breaker. As the circuit breaker resets, the shunt trip reset arm is actuated by the circuit breaker handle, resetting the shunt trip. The plug-in module is mounted in retaining slots in the top of the trip unit. Coil is intermittent-rated only. Cutoff provisions required in control circuit.

**Undervoltage Release Mechanism**

The undervoltage release mechanism monitors a voltage (typically a line voltage) and trips the circuit breaker when the voltage falls to between 70 and 35 percent of the solenoid coil rating.

The undervoltage release mechanism consists of a continuous rated solenoid with a plunger and tripping lever mounted in a plug-in module. The tab on the tripping lever resets the undervoltage release mechanism when normal voltage has been restored and the circuit breaker handle is moved to the reset (or OFF) position. With less than pickup voltage applied to the undervoltage release mechanism, the circuit breaker contacts will not touch when a closing operation is attempted.

**Note:** Undervoltage release mechanism accessories are not designed for, and should not be used as, circuit interlocks.

**Accessory Terminal Block (R-Frame)**

(For fixed-mounted configuration.)

Internal accessory wiring leads are normally supplied with pigtail leads (18 AWG) that exit from the right side of the circuit breaker. Where specified, fixed-mounted accessory terminal blocks are available. A maximum of one 24-point terminal block can be installed on the right side of the circuit breaker for the internal accessories.

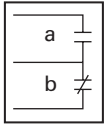
For convenience in determining the appropriate number of terminal block points required, refer to **Page V4-T2-378**.

**PowerNet and Zone Interlock Kits (OPTIM 550 only) K-, L- and N-Frames**

Eaton's PowerNet Communications Kit can be ordered to add PowerNet communications to an existing OPTIM 550 breaker in the field. An 18-inch (457.2 mm) wiring pigtail is routed to the rear of the breaker: two wires for PowerNet and two wires for 24 Vdc (45 mA load). It is recommended that the power supply be an "isolated high quality" unit.

## Auxiliary Switch

## Auxiliary Switch



## G-Frame Auxiliary Switch (RH Only)

Electrical Ratings			Contact Arrangement	Factory Suffix	Catalog Number <sup>①②</sup>
Volts	Frequency	Amperes			
240	50/60 Hz	6	1a/1b	A3	1288C74G03
240	50/60 Hz	6	2a/2b	A6	1288C73G03

## F-Frame and HMCP (F) Auxiliary Switch

Number of Contacts A and B	Mounting Location (Pole)	Factory Mounted Connection Type and Location 18-Inch (457.2 mm) Pigtail Leads				Factory Installation Kit <sup>④</sup>	
		Same Side Suffix Number	Rear <sup>③</sup> Suffix Number	Opposite Side Suffix Number	Terminal Block Same Side Suffix Number	Pigtail Leads Catalog Number	Terminal Block Catalog Number
		1	Left <sup>⑤</sup>	A01	A02	A03	A04
	Left <sup>⑤</sup>	A15 <sup>⑦</sup>	A16 <sup>⑦</sup>	A17 <sup>⑦</sup>	—	E1X1PK	—
	Right or Neutral <sup>⑥</sup>	A05	A06	A07	A08	A1X1PK	A1X1RTK <sup>⑧</sup>
	Right or Neutral <sup>⑥</sup>	A18 <sup>⑦</sup>	A19 <sup>⑦</sup>	A20 <sup>⑦</sup>	—	—	—
2	Left <sup>⑤</sup>	A09	A10	—	A11	A2X1LPK	A2X1LTK
	Left <sup>⑤</sup>	A21 <sup>⑦</sup>	A22 <sup>⑦</sup>	—	—	E2X1LPK	—
	Right or Neutral <sup>⑥</sup>	A12	A13	—	A14	A2X1RPK	A2X1RTK <sup>⑧</sup>
	Right or Neutral <sup>⑥</sup>	A23 <sup>⑦</sup>	A24 <sup>⑦</sup>	—	—	E2X1RPK	—

F-Frame with Electronic Trip Unit Auxiliary Switch <sup>⑨</sup>

Number of Contacts A and B	Mounting Location (Pole)	Factory Mounted Connection Type and Location 18-Inch (457.2 mm) Pigtail Leads				Factory Installation Kit <sup>④</sup>	
		Same Side Suffix Number	Rear <sup>③</sup> Suffix Number	Opposite Side Suffix Number	Terminal Block Same Side Suffix Number	Pigtail Leads Catalog Number	Terminal Block Catalog Number
		<b>Trip Unit Type 310+</b>					
1	Right	A30	A31	A32	—	—	—
<b>Trip Unit Type 210+</b>							
1	Right	A33	A34	A35	—	—	—

## J-Frame and HMCP (J) Auxiliary Switch

Number of Contacts A and B	Mounting Location (Pole)	Factory Mounted Connection Type and Location 18-Inch (457.2 mm) Pigtail Leads				Field Mounted Factory Installation Kit <sup>⑩</sup>	
		Same Side Suffix Number	Rear <sup>③</sup> Suffix Number	Opposite Side Suffix Number	Terminal Block Same Side Suffix Number	Pigtail Leads Catalog Number	Terminal Block Catalog Number
		1	Left	A01	A02	A03	A04
	Right <sup>⑩</sup>	A05	A06	A07	A08	A1X2PK	A1X2RTK <sup>⑩</sup>
2	Left	A09	A10	—	A11	A2X2PK	A2X2LTK
	Right <sup>⑩</sup>	A12	A13	—	A14	A2X2PK	A2X2RTK <sup>⑩</sup>

## Notes

- ① Includes 24-inch external pigtail leads, 18 AWG (16–0.010).
- ② A maximum of two internal accessories may be mounted in a three-pole circuit breaker. Suitable for mounting in right pole only of two- or three-pole breaker.
- ③ Standard pigtail lead exit location.
- ④ Not listed with Underwriters Laboratories; for field installation.
- ⑤ Pigtail wire size: 18 AWG (0.82 mm<sup>2</sup>).
- ⑥ Not for use on F-Frame with electronic trip unit.
- ⑦ 125 volts (max.), 50/60 Hz switch for use in electronic circuit of 100 micro amperes and 15 Vdc minimum.
- ⑧ Not for use on four-pole circuit breakers.
- ⑨ Only for use on three-pole F-Frame breakers with electronic trip unit. Installation auxiliary switch for FD electronic breakers on right pole must be performed at breaker factory.
- ⑩ Listed with Underwriters Laboratories for field installation or interchangeable trip unit breakers under E64983.
- ⑪ Standard mounting location—leads exit rear of breaker.

## Accessories Selection Guide and Ordering Information

### Enclosures

#### Type 1 General Purpose

- Surface or flush mounting
- 15–1200 ampere range
- 600 Vac, 500 Vdc

Type 1 enclosed breakers are designed for use in commercial buildings, apartment buildings and other areas where a general purpose enclosure is applicable. The breaker is front operable and is capable of being padlocked in either the ON or OFF position. Ratings through 1200 amperes are listed with Underwriters Laboratories as approved for service entrance application. Both surface and flush mounted enclosures are available.

#### Type 3R Rainproof Surface Mounting

- Interchangeable hubs (through 400 amperes)
- 15–1200 ampere range
- 600 Vac, 500 Vdc

This general purpose outdoor service center employs a circuit breaker inside a weatherproof sheet steel breaker enclosure to serve

as a main disconnect and protective device for feeder circuits. Ratings through 1200 amperes are listed by Underwriters Laboratories as suitable for service entrance application.

#### Type 12 Dustproof Surface Mounting

- No knockouts or other openings
- 15–1200 ampere range
- 600 Vac, 500 Vdc

The Type 12 enclosure is designed in line with specifications for special industry applications where unusually severe conditions involving oil, coolant, dust and other foreign materials exist in the operating atmosphere. The handle padlocks in the OFF position and the cover is interlocked with the handle mechanism to prevent opening the cover with the circuit breaker in the ON position. Ratings through 1200 amperes are listed by Underwriters Laboratories as suitable for service entrance application.

### Enclosure Selection Data

Breaker Frame Amperes	Enclosure Type Class	Catalog Number
FG 15–225	Type 1	SFDN225
	Type 3R	RFDN225
	Type 12	JFDN225
JG 175–250	Type 1	SJDN250
	Type 3R	RJDN250
	Type 12	JJDN250
KG 300–400	Type 1	SKDN400
	Type 3R	RKDN400
	Type 12	JKDN400
LG 450–600	Type 1	SLDN600
	Type 3R	RLDN600
	Type 12	JLDN600
NG 700–1200	Type 1	SNDN1200
	Type 3R	RNDN1200
	Type 12	JNDN1200

## Options and Accessories

### Standard Terminals

Breaker Frame	Max. Amp Rating	AWG Wire Range	Metric Wire Range mm <sup>2</sup>	Catalog Number
FG	100	14–1/0	2.5–50	3T100FB ①
FG	150	4–4/0	25–95	3TA225FD ①
JG	250	4–350 kcmil	25–185	TA250KB
KG	350	250–500 kcmil	120–240	TA350K
KG	400	3/0–250 kcmil (2)	95–120	3TA400K ①
LG	600	250–500 kcmil (2)	120–240	3TA603LDK
NG	700	1–500 kcmil (2)	50–300	TA700NB1
NG	1000	3/0–400 kcmil (3)	95–185	TA1000NB1
NG	1200	4/0–500 kcmil (4)	120–300	TA1200NB1

### Neutral Kits, Insulated and Groundable

Max. Enclosure Rating (Amperes)	Main Lug Number Size Cu/Al	Ground Lug Size Cu/Al	Catalog Number
100	(1) 14–1/0	(1) 14–1/0	INK100
250	(1) 6–350 kcmil	(1) 4–300 kcmil	INK250
400	(1) 4–750 kcmil or (2) 1/0–250 kcmil	(1) 4–300 kcmil	INK400
600	(2) 250–500 kcmil	(1) 4–300 kcmil	INK600
1200	(3) 1/0 to 750 kcmil or (4) 1/0 to 750 kcmil	(1) 6–250 kcmil	INK1200

### Internal Accessories

#### Auxiliary Switch ②

Breaker Frame	Factory Mounted	1A-1B		2A-2B	
		Field Kit Catalog Number	Factory Mounted	Field Kit Catalog Number	Factory Mounted
FG ③	A06	A1X1PK	A13	A2X1RPK	A13
JG	A06	A1X2PK	A13	A2X2PK	A13
KG	A06	A1X3PK	A13	A2X3PK	A13
LG	A06	A1X4PK	A13	A2X4PK	A13
NG	A06	A1X5PK	A13	A2X5PK	A13

#### Shunt Trip ②

Breaker Frame	Rating	Factory Mounted	Field Kit Catalog Number
FG ③	12–24 Vdc	S02	SNT1LP03K
JG	12–24 Vdc	S42	SNT2P04K
KG	12–24 Vdc	S42	SNT3P04K
LG	12–24 Vdc	S02	SNT4LP03K
NG	12–24 Vdc	S02	SNT5LP03K

#### Notes

- ① Package of three terminals.
- ② Other accessories are available. Same as standard frame breakers.
- ③ Field installation on the FG Frame is not UL listed.

## Accessories

## Internal Accessories

Description	Factory Installation (HFDDC)	Field Installation Kits								
		HFDDC ①	EGEDC, EGSDC, EGHDC	JGEDC, JGSDC, JGHDC	LGEDC, LGSDC, LGHDC	HJDDC	HKDDC	HLDDC	HMDLDC	NBDC
<b>Right-Pole Mounting</b>										
Auxiliary switch										
1A-1B	A06	A1X1PK	AUX1A1BPK	AUX1A1BPK	A1X2PK	A1X3PK	A1X4PK	A1X4PK	4980D16G05	—
2A-2B	A13	A2X1RPK	AUX2A2BPK	AUX2A2BPK	A2X2PK	A2X3PK	A2X4PK	A2X4PK	4980D16G06	A2X6RPK
Alarm switch										
1 make/1 break	B06	A1L1RPK	ALM1M1BEPK	ALM1M1BJPK	A1L2RPK	A1L3RPK	A1L4RPK	A1L4RPK	—	A1L6RPK
Auxiliary and alarm combo										
1A-1B, 1 make/1 break	C05	AAL1RPK	AUXALRMEPK	AUXALRMJPK	AAL2RPK	AAL3RPK	AA114RPK	AA114RPK	—	—
<b>Left-Pole Mounting</b>										
Shunt trip										
12 Vdc	S02	SNT1LP03K	SNT012CPK	SNT012CPK	SNT2P04K	SNT3P04K	SNT4LP03K	SNT4LP03K	2606D58G14	—
24 Vdc	S02	SNT1LP03K	SNT024CPK	SNT024CPK	SNT2P04K	SNT3P04K	SNT4LP03K	SNT4LP03K	2606D58G13	SNT6P03K ②
48 Vdc	S06	SNT1LP08K	SNT4860CPK	SNT4860CPK	SNT2P06K	SNT3P06K	SNT4LP23K	SNT4LP23K	2606D58G12	SNT6P23K ②
60 Vdc	S06	SNT1LP08K	SNT4860CPK	SNT4860CPK	SNT2P06K	SNT3P06K	SNT4LP23K	SNT4LP23K	2606D58G11	SNT6P23K ②
125 Vdc	S10	SNT1LP12K	SNT120CPK	SNT120CPK	SNT2P11K	SNT3P11K	SNT4LP26K	SNT4LP26K	2606D58G10	SNT6P23K ②
250 Vdc	S14	SNT1LP18K	—	—	SNT2P14K	SNT3P14K	SNT4LP14K	SNT4LP14K	2606D58G09	SNT6P14K
120 Vac	S06	SNT1LP12K	SNT120CPK	SNT120CPK	SNT2P11K	SNT3P11K	SNT4LP11K	SNT4LP11K	2060D58G05	SNT6P11K ②
Undervoltage release										
12 Vdc	U30	UVH1LP20K	UVR012DPK	UVR012DPK	UVH2LP20K	UVH3LP20K	UVH4LP20K	UVH4LP20K	372D032G06	UVH6RP20K ②
24 Vdc	U34	UVH1LP21K	UVR024DPK	UVR024DPK	UVH2LP21K	UVH3LP21K	UVH4LP21K	UVH4LP21K	372D032G07	UVH6RP21K ②
48 Vdc	U38	UVH1LP22K	UVR048DPK	UVR048DPK	UVH2LP22K	UVH3LP22K	UVH4LP22K	UVH4LP22K	372D032G08	UVH6RP23K ②
125 Vdc	U42	UVH1LP26K	UVR125DPK	UVR125DPK	UVH2LP26K	UVH3LP26K	UVH4LP26K	UVH4LP26K	372D032G09	UVH6RP26K ②
250 Vdc	U46	UVH1LP28K	UVR250DPK	UVR250DPK	UVH2LP28K	UVH3LP28K	UVH4LP28K	UVH4LP28K	372D032G10	UVH6RP28K ②
120 Vac	U14	UVH1LP08K	UVR120APK	UVR120APK	UVH2LP08K	UVH3LP08K	UVH4LP08K	UVH4LP08K	373D632G05	UVH6RP08K ②

**Notes**

① F-Frame circuit breakers are factory sealed. Underwriters Laboratories requires that internal accessories be installed at the factory. Internal accessories are UL listed for factory installation under E7819. Where local codes and standards permit and UL listing is not required, internal accessories can be field installed. Accessory installation should be done before the circuit breaker is mounted and connected.

② Right-pole mounted.

One accessory can be mounted per pole, per breaker. Factory installation of accessories is available. Contact Eaton for assistance with part number configuration.

## Shunt Trip ①

Breaker Type	Voltage Rating	Mounting Location	Catalog Number	Factory Modification Code
E <sup>2</sup> F/E <sup>2</sup> FM	48–127 Vac or 48–60 Vdc	Left pole	<b>SNT1LP08K</b> ②	S06
	208–230 Vac or 110–127 Vdc	Left pole	<b>SNT1LP12K</b> ②	S10
E <sup>2</sup> J/E <sup>2</sup> JM	110–240 Vac or 110–125 Vdc	Left pole	<b>SNT2P11K</b> ③	S10
E <sup>2</sup> K/E <sup>2</sup> KM/E <sup>2</sup> KW	110–240 Vac or 110–125 Vdc	Left pole	<b>SNT3P11K</b> ③	S10
E2LME/E2LMZ	24 Vac/Vdc	Left pole	<b>SNT024CPK</b>	S6
	48–60 Vac/Vdc	Left pole	<b>SNT4860CPK</b>	S7
	110–240 Vac/Vdc	Left pole	<b>SNT120CPK</b>	S2
E <sup>2</sup> L/E <sup>2</sup> LM/E <sup>2</sup> LW/E <sup>2</sup> M/ E <sup>2</sup> MM/E <sup>2</sup> MW	48–60 Vac	Left pole	<b>SNT4LP05K</b> ②	S06
	48–60 Vdc	Left pole	<b>SNT4LP23K</b> ②	S86
	110–240 Vac	Left pole	<b>SNT4LP11K</b> ②	S10
	110–125 Vdc	Left pole	<b>SNT4LP26K</b> ②	S42
E <sup>2</sup> N/E <sup>2</sup> NM	110–240 Vac	Left pole	<b>SNT5LP11K</b> ②	S10
	110–125 Vdc	Left pole	<b>SNT5LP26K</b> ②	S42
E <sup>2</sup> R/E <sup>2</sup> RM	110–240 Vac	Right pole	<b>SNT6P11K</b> ④	S29
	110–125 Vdc	Right pole	<b>SNT6P26K</b> ④	S45

## Auxiliary Switch

Breaker Type	Number of Sets of Contacts (1A and 1B)	Mounting Location	Catalog Number	Factory Modification Code
E <sup>2</sup> F/E <sup>2</sup> FM	1	Right	<b>A1X1PK</b>	A06
	2	Right	<b>A2X1RPK</b>	A13
E <sup>2</sup> J/E <sup>2</sup> JM	1	Right	<b>A1X2PK</b>	A06
	2	Right	<b>A2X2PK</b>	A13
E <sup>2</sup> K/E <sup>2</sup> KM/E <sup>2</sup> KW	1	Right	<b>A1X3PK</b>	A06
	2	Right	<b>A2X3PK</b>	A13
E <sup>2</sup> LME/E <sup>2</sup> LMZ	1	Right	<b>AUX1A1BPK</b>	A1
	2	Right	<b>AUX2A2BPK</b>	A2
E <sup>2</sup> L/E <sup>2</sup> LM/E <sup>2</sup> LW/E <sup>2</sup> M/ E <sup>2</sup> MM/E <sup>2</sup> MW	1	Right	<b>A1X4PK</b>	A06
	2	Right	<b>A2X4PK</b>	A13
E <sup>2</sup> N/E <sup>2</sup> NM	1	Right	<b>A1X5PK</b>	A06
	2	Right	<b>A2X5PK</b>	A13
E <sup>2</sup> R/E <sup>2</sup> RM	2	Right	<b>A2X6RPK</b>	A12
	4	Right	<b>A4X6RPK</b>	A19

## Alarm (Signal/Lockout Switch)

Breaker Type	Number of Sets of Contacts (Make and Break)	Mounting Location	Catalog Number	Factory Modification Code
E <sup>2</sup> F/E <sup>2</sup> FM	1	Right	<b>A1L1LPK/A1L1RPK</b>	B06
	2	Right	<b>A2L1LPK/A2L1RPK</b>	B13
E <sup>2</sup> J/E <sup>2</sup> JM	1	Right	<b>A1L2LPK/A1L2RPK</b>	B06
E <sup>2</sup> K/E <sup>2</sup> KM/E <sup>2</sup> KW	1	Right	<b>A1L3LPK/A1L3RPK</b>	B06
	2	Right	<b>A2L3LPK/A2L3RPK</b>	B13
E <sup>2</sup> LME/E <sup>2</sup> LMZ	1	Right	<b>ALM1M1BJPK</b>	B1
	2	Right	<b>ALM2M2BJPK</b>	B3
E <sup>2</sup> L/E <sup>2</sup> LM/E <sup>2</sup> LW/E <sup>2</sup> M/ E <sup>2</sup> MM/E <sup>2</sup> MW	1	Right	<b>A1L4LPK/A1L4RPK</b>	B06
	2	Right	<b>A2L4LPK/A2L4RPK</b>	B13
E <sup>2</sup> N/E <sup>2</sup> NM	1	Right	<b>A1L5LPK/A1L5RPK</b>	B06
	2	Right	<b>A2L5LPK/A2L5RPK</b>	B13
E <sup>2</sup> R/E <sup>2</sup> RM	1	Right	<b>A1L6RPK</b>	B05
	2	Right	<b>A2L6RPK</b>	B12

## Notes

- ① Contact Eaton for internal accessory voltage ratings not listed.
- ② LH (RH also available).
- ③ LH or RH.
- ④ RH only.