E-Series protective relays

Feeder distribution relays
Motor relays   Generator relays
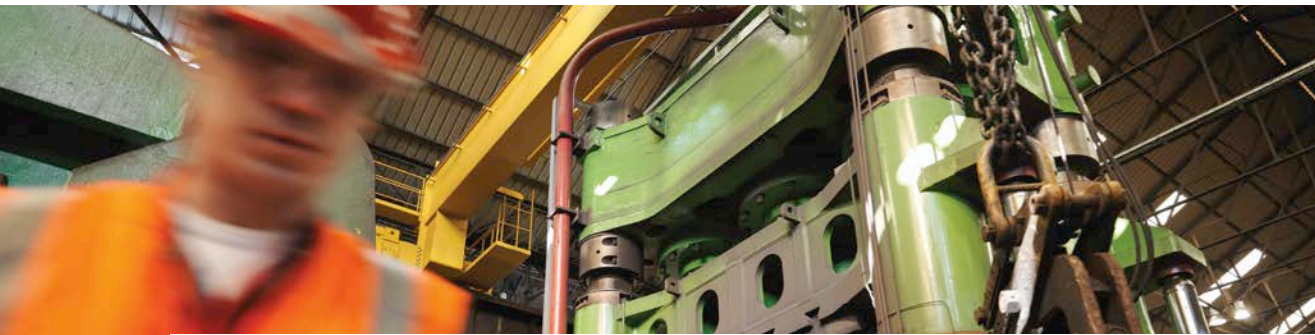Transformer relays   Bus relays

E-Series protective relay family

Reliable protection for every application

EAT·N

● Operational

	EDR-5000	
Ph OC Trip		Bkr Open
Gnd OC Trip		Bkr Closed
Ph Inst Trip		Volt Trip
Gnd Inst Trip		Freq Trip
Pickup		Zone Inter. Trip
Bkr Failure		VT Failure
Maint. Mode		Other Trip

Info   Ack/Rst   Ok   CTRL

EDR-5000

EAT·N

Powering Business Worldwide

Eaton´s E-Series protective relays

Eaton's E-Series microprocessor-based protective relays offer reliable, secure and complete protection and control of power generation and distribution systems. The hardware and software commonality across the E-Series family platform makes it easy for users to program simple to complex settings or schemes for each of their unique applications. The powerful multi-core processors and intuitive user interface provide for flexible configurations and simple alarming and notifications.

Common features across the E-Series relay family include:

Protection/security
- Maintenance mode
- Zone selective interlocking
- Multi-level password protected
- Self-shorting/finger-safe/ removable terminals

Control
- Programmable relay outputs
- Digital inputs with adjustable thresholds via software
- Eight common pushbuttons
- Programmable logic elements (up to 80)
- Wide ac/dc power supply range

Information
- Device setting and waveform software
- USB front access port
- High-contrast, illuminated HMI
- Programmable LEDs
- Cause-of-Trip information can be viewed on the display

Common software tools

All E-Series relays use the same software interface for easy access to information and programming of settings. Whether you are using the front panel or the external software, the interface is the same on all models.

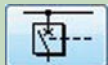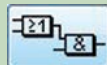| Operation | System Parameters | Protection Parameters | Device Parameters | Control | Logic | Device Planning | Service |

Download PowerPort-E software and device models including Quality Manager at **www.eaton.com/pr**

Relay Software Updates (Downloads)

Feeder distribution relay

Feeder distribution relays provide complete protection for medium-voltage feeder distribution lines.

Models include:
- EDR-3000
- EDR-5000

EDR-5000

Generator relay

Generator protection relays can be used to protect any size generators. They may be used as primary or backup protection in standby generators and cogeneration applications.

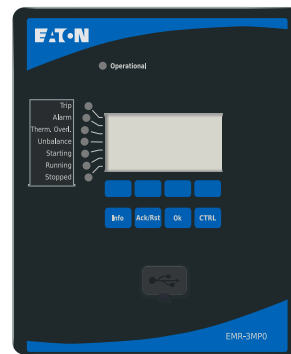Models include:
- EGR-5000 (includes generator differential)

EGR-5000

Motor relay

Motor relays provide complete and reliable motor protection for any size motor at different voltage levels, including diagnostics, monitoring and starting control functions.

Models include:
- EMR-3000
- EMR-4000
- EMR-5000 (includes motor differential)

EMR-3000

Retrofit MP-3000

The EMR-3MP0 has been specially designed to simplify the settings and configuration, providing a user experience very similar to the now obsolete Eaton MP-3000 motor relay.

Models include:
- EMR-3MP0

EMR-3MP0

Transformer relay

Transformer relays provide primary protection, control and backup protection of transformers, including current differential, restricted ground differential and overcurrent protection.

Models include:
- ETR-4000
- ETR-5000

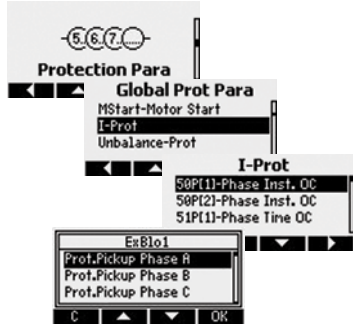**ETR-5000**

High-impedance bus differential relay

High-impedance bus differential relays can be used to protect switchgear bus and transformers. The EBR-3000 relay, combined with an EBR-Z (EBR-3Z) is a simple solution for differential protection.

Models include:
- EBR-3Z (dual-mounted EBR-3000 and EBR-Z)
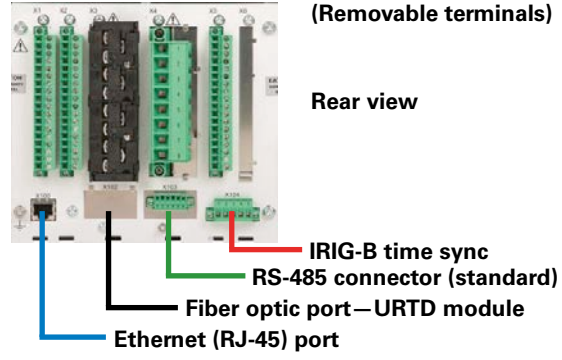- EBR-3000 + EBR-Z (separately mounted impedance module)

EBR-3Z/ EBR-3000 + EBR-Z

Common features

Front panel access

USB port (standard)

E-Series

HMI and software display the same folder structure

Communication and connection interfaces

(Removable terminals)

Rear view

IRIG-B time sync
RS-485 connector (standard)
Fiber optic port—URTD module
Ethernet (RJ-45) port

Reference order guide for availability by model.

E-Series relay family feature comparison chart

Description	EDR-3000	EDR-5000	EMR-3000	EMR-4000	EMR-5000	ETR-4000	ETR-5000	EGR-5000	EBR-3000
Metering and monitoring features									
Current (pos., neg. and zero seq.)	■	■	■	■	■	■	■	■	—
Current unbalance % (I2/I1)	■	■	■	■	■	■	■	■	—
Differential current	—	—	—	—	■	■	■	■	■
Voltage (L–L, L–N, pos., neg. and zero seq.)	—	■	—	■	■	—	■	■	—
Voltage unbalance % (V2/V1)	—	■	—	■	■	—	■	■	—
Phase angles	■	■	■	■	■	■	■	■	—
Volt-amps, watts, volt-amps reactive	—	■	—	■	■	—	■	■	—
kWh (forward, reverse and net)	—	■	—	■	■	—	■	■	—
kVArh (lead, lag and net)	—	■	—	■	■	—	■	■	—
Power factor	—	■	—	■	■	—	■	■	—
Frequency	—	■	—	■	■	—	■	■	—
Volts/Hz	—	—	—	—	■	—	■	■	—
2nd harmonic current % (H2/fund.)	—	—	—	—	—	■	■	—	—
3rd harmonic voltage	—	—	—	—	—	—	—	■	—
THD current (% and magnitude)	■	■	■	■	■	■	■	■	—
THD voltage (% and magnitude)	—	■	—	■	■	—	■	■	—
Minimum/maximum recording	■	■	■	■	■	■	■	■	—
Sync values	—	■	—	—	—	—	—	■	—
Temperature with remote URTD module	—	—	■	■	■	■	■	■	—
Trip circuit monitoring	■	■	■	■	■	■	■	■	■
Breaker wear and general counters	■	■	■	■	■	■	■	■	—
CT supervision	■	■	■	■	■	■	■	■	■
VT supervision	—	■	—	■	■	—	—	—	—
Waveform recorder (7200 cycles total storage)	■	■	■	■	■	■	■	■	■
Fault recorder (20 events)	■	■	■	■	■	■	■	■	■
Sequence of events recorder (300 events)	■	■	■	■	■	■	■	■	■
Trend recorder	■	■	■	■	■	■	■	■	■
Motor history, start trending, thermal capacity	—	—	■	■	■	—	—	—	—
Generator hours of operation	—	—	—	—	—	—	—	■	—
Programmable logic equations (up to 80)	■	■	■	■	■	■	■	■	■
Communications protocols									
Modbus RTU or DNP3 RTU over RS-485	■	■	■	■	■	■	■	■	■
Modbus TCP or DNP3 TCP/UDP over Ethernet RJ-45	■	■	■	■	■	■	■	■	■
PROFIBUS-DP over fiber optic ST	■	■	■	■	■	■	■	■	■
PROFIBUS-DP over D-Sub / RS-485	■	■	■	■	■	■	■	■	■
Modbus RTU or DNP3 RTU over fiber optic ST	■	■	■	■	■	■	■	■	■
Modbus RTU or DNP3 RTU over D-Sub / RS-485	■	■	■	■	■	■	■	■	■
IEC 61850 or Modbus TCP or DNP3 TCP/UDP over Ethernet RJ-45	■	■	■	■	■	■	■	■	■
Modbus RTU or DNP3 RTU over RS-485 or Modbus TCP or DNP3 TCP/UDP over Ethernet RJ-45	■	■	■	■	■	■	■	■	■
IEC 61850 or Modbus TCP or DNP3 TCP/UDP over LC duplex fiber optic Ethernet	■	■	■	■	■	■	■	■	■
Modbus TCP or DNP3 TCP/UDP over LC duplex fiber optic Ethernet	■	■	■	■	■	■	■	■	■

The E-Series family platform makes
it easy for users to program simple
to complex settings or schemes
for each of their unique applications.
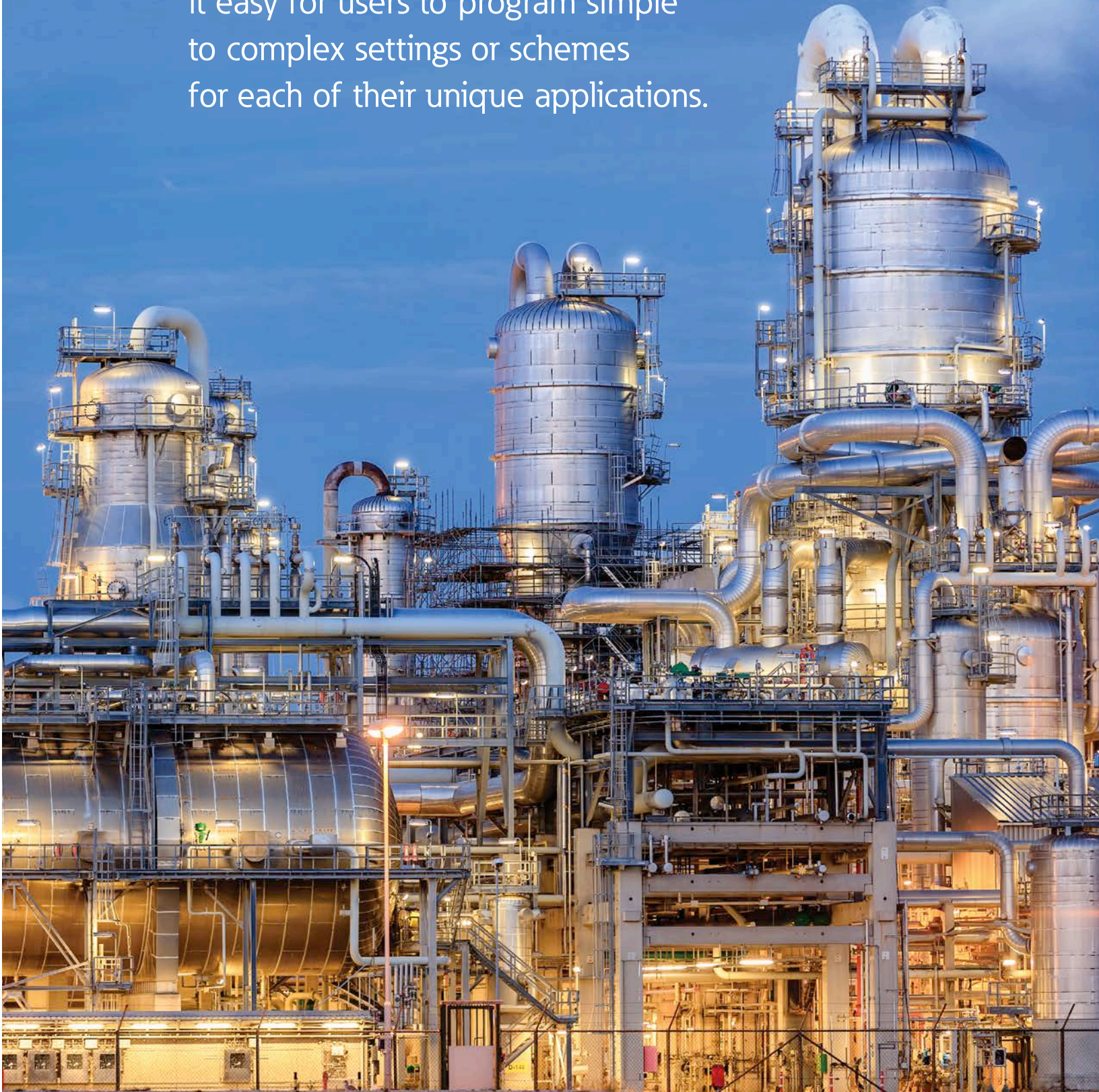
Eaton's distribution relay family–EDR Series

Model comparison guide–protective functions

EDR-3000	EDR-5000
Protection functions **46**—Current unbalance elements **50BF**—Breaker failure **50P**—Phase instantaneous overcurrent elements **50R**—Calculated ground or neutral instantaneous overcurrent elements **50X**—Measured ground or neutral instantaneous overcurrent elements **51P**—Phase overcurrent protection per time-current curve elements **51R**—Calculated ground fault protection per time-current curve elements **51X**—Measured ground or neutral fault protection per time-current curve elements **CLPU**—Cold load pickup **SOTF**—Switch on to fault **CTS**—Current transformer supervision **74TCM**—Trip coil monitor (option) **ZI**—Zone selective interlocking (option)	The EDR-5000 has all of the same protection functions as the EDR-3000 with additional features. **Enhanced protection functions** **27A/M**—Auxiliary and main three-phase undervoltage elements **51V**—Voltage restraint elements **47**—Voltage unbalance elements **79**—Auto-reclosing **55A/D**—Apparent and displacement power factor elements **27T**—Low voltage ride-through (LVRT) **59A/M**—Auxiliary and main three-phase overvoltage elements **27Q**—Reactive power and undervoltage **59N**—Ground fault overvoltage elements **67P**—Directional overcurrent elements **67X**—Calculated directional overcurrent elements **78V**—Vector surge element **81U/O/R**—Under and over and rate of change frequency elements **LOP**—Loss of potential **25**—Sync check **32**—Forward and reverse watts elements **32V**—Forward and reverse VARs elements

Typical one-line example—ANSI protective elements guide
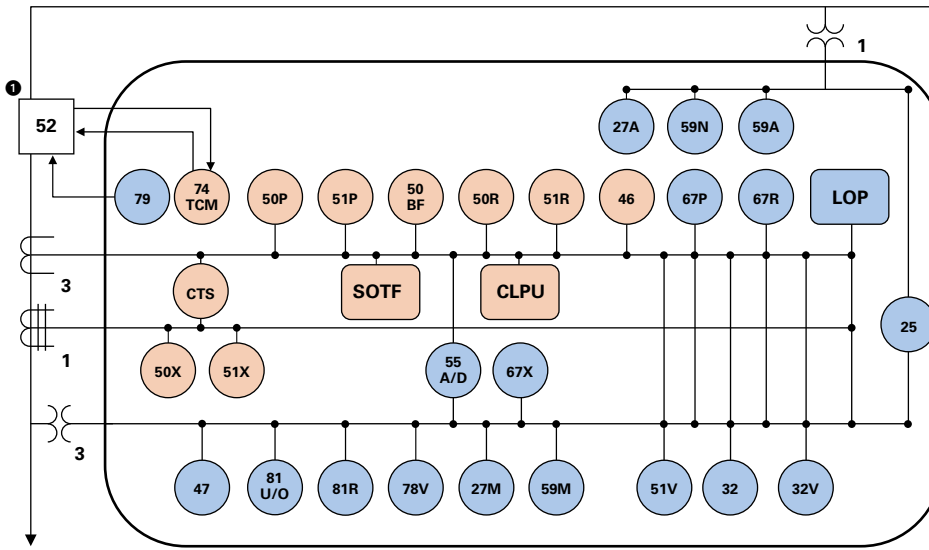
Protective elements key

■ = Elements available on EDR-3000 and EDR-5000

■ = Elements available on EDR-5000

See **Page 4** for metering features.

❶ 52—circuit breaker.

EDR family ordering guide

EDR- **5000** -2 A 0 B A 1

Relay model
3000	= Current protection relay
5000	= Current, voltage and power protection relay

EDR-3000 hardware option 1
A = 4 DI, 4 outputs
B = 8 DI, 6 outputs, trip coil monitor
C = 4 DI, 4 outputs, zone selective interlocking (ZSI) and IRIG-B

OR

EDR-5000 hardware option 1
A = 8 DI, 10 outputs, ZSI and IRIG-B
B = 16 DI, 10 outputs, ZSI and IRIG-B

Hardware option 2
0 = Phase current 5 A / 1 A, ground current 5 A / 1 A, power supply range: 19–300 Vdc, 40–250 Vac
1 = Phase current 5 A / 1 A, sensitive ground current 0.5 A / 0.1 A, power supply range: 19–300 Vdc, 40–250 Vac

Mounting options
0 = Standard mount
1 = Projection mount

Conformal coating options
A = None
B = Conformal coated circuit boards

Communication options
B = Modbus/DNP3 RTU over RS-485
C = Modbus/DNP3 TCP over Ethernet RJ-45
D = PROFIBUS-DP over fiber optic ST
E = PROFIBUS-DP over D-Sub / RS-485
F = Modbus RTU or DNP3 RTU over fiber optic ST
G = Modbus/DNP3 RTU over D-Sub / RS-485
H = IEC 61850/Modbus/DNP3 TCP over Ethernet RJ-45
I = Modbus/DNP3 RTU over RS-485 or Modbus/DNP3 TCP over Ethernet RJ-45
K = IEC 61850/Modbus/DNP3 TCP over LC duplex fiber optic Ethernet
L = Modbus/DNP3 TCP over LC duplex fiber optic Ethernet

Eaton's motor relay family—EMR Series

Model comparison guide–protective functions

EMR-3000	EMR-4000	EMR-5000
Protection functions	The EMR-4000 has all of the same protection functions as the EMR-3000 with additional features.	The EMR-5000 has all of the same protection functions as the EMR-4000 with additional features.
50BF—Breaker failure		
50P—Phase instantaneous overcurrent elements	**Enhanced protection functions**	**Enhanced protection functions**
50R—Calculated ground or neutral instantaneous overcurrent elements	**27A/M**—Auxiliary and main three-phase undervoltage elements	**87M**—Differential current elements
50X—Measured ground or neutral instantaneous overcurrent elements	**47**—Voltage unbalance elements	
51P—Phase overcurrent protection per time-current curve elements	**55A/D**—Apparent and displacement power factor elements	
51R—Calculated ground fault protection per time-current curve elements	**59A/M**—Auxiliary and main three-phase overvoltage elements	
51X—Measured ground or neutral fault protection per time-current curve elements	**59N**—Ground fault overvoltage elements	
46—Current unbalance elements	**32/32V**—Forward and reverse watts and VARs elements	
49/38—Thermal protection using optional URTD module	**51V**—Voltage restraint elements	
49/51—Thermal overload protection (I²T)	**78V**—Vector surge element	
49S/51—Locked rotor	**81U/O/R**—Under and over and rate of change frequency elements	
50J—Jam or stall protection	**LOP**—Loss of potential	
37—Underload protection	**CLPU**—Cold load pickup	
66—Starts per time period	**SOTF**—Switch on to fault	
14—Underspeed	**BRB**—Broken rotor bar detection	
CTS—Current transformer supervision		
74TCM—Trip coil monitor (option)		
ZI—Zone selective interlocking (option)		
86—Lockout protection		

Typical one-line example—ANSI protective elements guide

Protective elements key

■ = Elements available on all EMR models
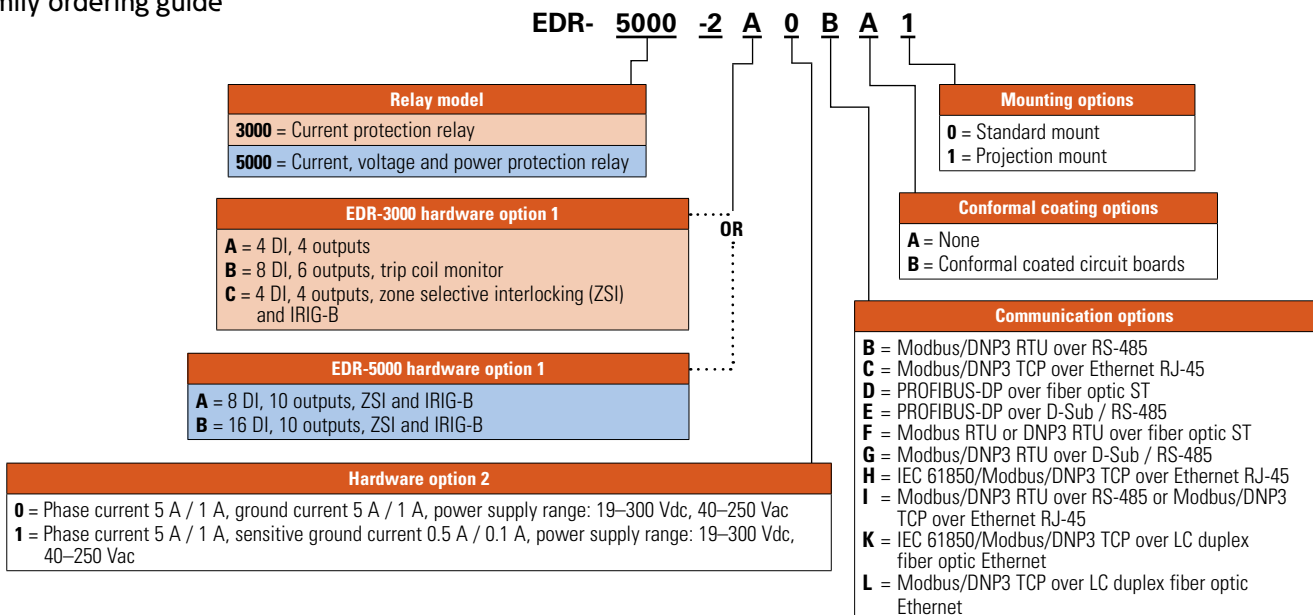
■ = Elements available on EMR-4000 and EMR-5000

■ = Elements available on EMR-5000

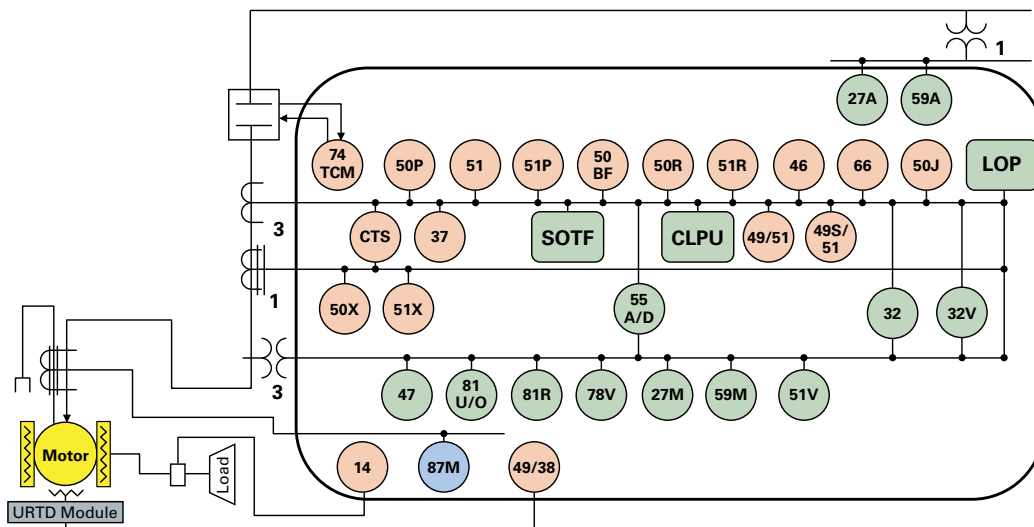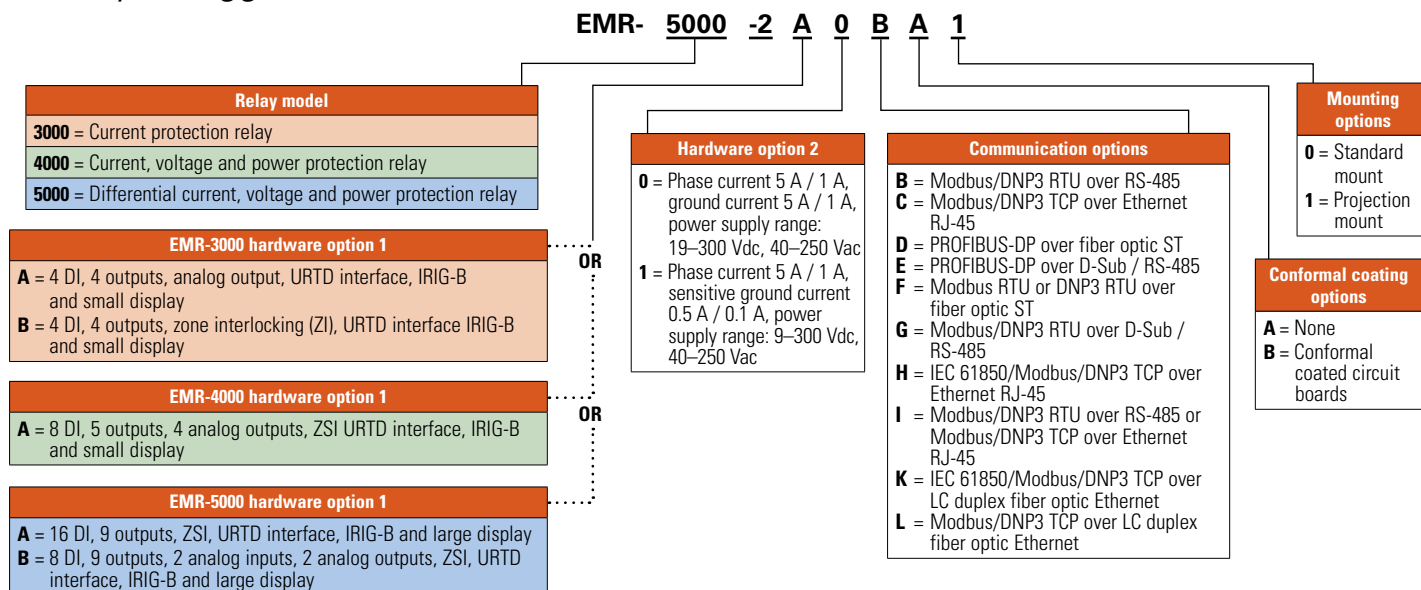See **Page 4** for metering features.

EMR family ordering guide

EMR- **5000** -**2** **A** **0** **B** **A** **1**

Relay model
3000 = Current protection relay
4000 = Current, voltage and power protection relay
5000 = Differential current, voltage and power protection relay

EMR-3000 hardware option 1
A = 4 DI, 4 outputs, analog output, URTD interface, IRIG-B and small display
B = 4 DI, 4 outputs, zone interlocking (ZI), URTD interface IRIG-B and small display

EMR-4000 hardware option 1
A = 8 DI, 5 outputs, 4 analog outputs, ZSI URTD interface, IRIG-B and small display

EMR-5000 hardware option 1
A = 16 DI, 9 outputs, ZSI, URTD interface, IRIG-B and large display
B = 8 DI, 9 outputs, 2 analog inputs, 2 analog outputs, ZSI, URTD interface, IRIG-B and large display

OR

OR

Hardware option 2
0 = Phase current 5 A / 1 A, ground current 5 A / 1 A, power supply range: 19–300 Vdc, 40–250 Vac
1 = Phase current 5 A / 1 A, sensitive ground current 0.5 A / 0.1 A, power supply range: 9–300 Vdc, 40–250 Vac

Communication options
B = Modbus/DNP3 RTU over RS-485
C = Modbus/DNP3 TCP over Ethernet RJ-45
D = PROFIBUS-DP over fiber optic ST
E = PROFIBUS-DP over D-Sub / RS-485
F = Modbus RTU or DNP3 RTU over fiber optic ST
G = Modbus/DNP3 RTU over D-Sub / RS-485
H = IEC 61850/Modbus/DNP3 TCP over Ethernet RJ-45
I = Modbus/DNP3 RTU over RS-485 or Modbus/DNP3 TCP over Ethernet RJ-45
K = IEC 61850/Modbus/DNP3 TCP over LC duplex fiber optic Ethernet
L = Modbus/DNP3 TCP over LC duplex fiber optic Ethernet

Mounting options
0 = Standard mount
1 = Projection mount

| Conformal coating options |
|---|
| **A** = None |
| **B** = Conformal coated circuit boards |

Eaton's motor relay family–EMR Series

Model comparison guide–protective functions

The EMR-3MP0 relay is a current-only device that provides complete and reliable motor protection, monitoring and starting control functions. The EMR-3MP0 has been specially designed to simplify the settings and configuration, providing a user experience very similar to the now obsolete Eaton MP-3000 motor relay.

EMR-3MP0

Protection functions
- **14**—Underspeed
- **37**—Underload protection
- **46**—Current unbalance elements
- **49/51**—Thermal overload protection (I²T)
- **49S/51**—Locked rotor
- **50J**—Jam or stall protection
- **50BF**—Breaker failure
- **50P**—Phase instantaneous overcurrent elements
- **50X**—Measured ground or neutral instantaneous overcurrent elements
- **66**—Starts per time period

Typical one-line example—protection function guide
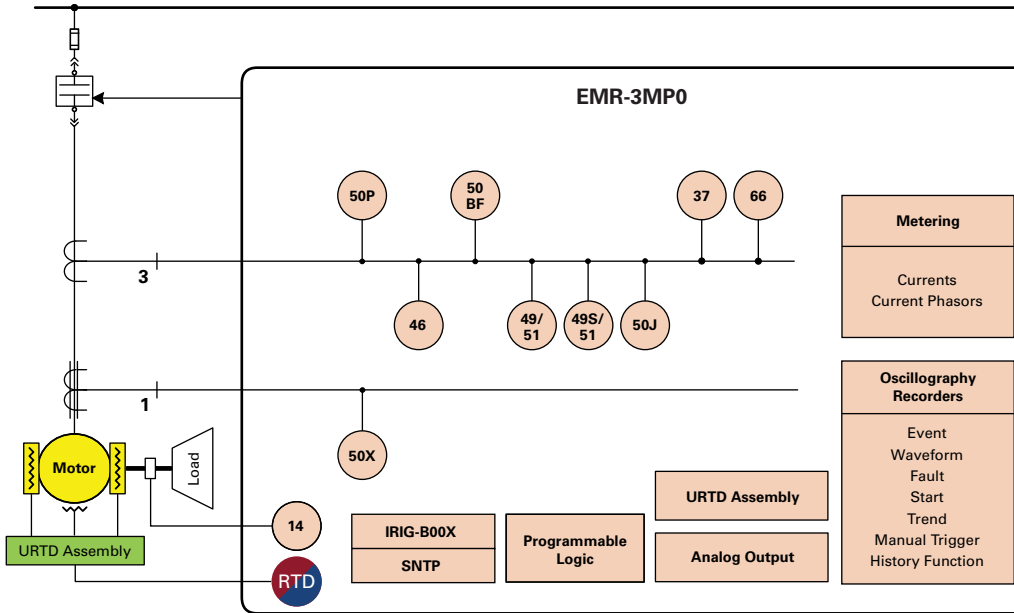
Protective elements key

- ▇ = Elements available on all EMR-3MP0 models
- ▇ = RTD (ANSI 26/38/49): requires URTD box (separate hardware)

EMR-3MP0 ordering guide

EMR- 3MPO -2 A 0 B A 1

EMR-3MP0 platform version

2 = Hardware version 2, USB Mini B connector at the front plate

EMR-3MP0 hardware option 1

A = 4 digital inputs, 4 output relays, removable terminals, 1 4…20 mA analog output, URTD interface, IRIG-B

EMR-3MP0 hardware option 2

0 = Standard CT input terminals with shorting block: phase current 5 A / 1 A, ground current 5 A / 1 A

9 = MP-3000-compatible CT input terminals: phase current 5 A, ground current 5 A

Communication options

A = Without communication protocol
B = RS-485; Modbus RTU / DNP3 RTU
C = Ethernet: Modbus TCP / DNP3 UDP/TCP
D = Fiber optics: PROFIBUS-DP
E = D-Sub: PROFIBUS-DP
F = Fiber optics: Modbus RTU / DNP3 RTU
G = RS-485/D-Sub: Modbus RTU / DNP3 RTU
H = Ethernet: IEC 61850 communication / Modbus TCP / DNP3 UDP/TCP
I = RS-485, Ethernet: Modbus TCP/RTU / DNP3 UDP/TCP/RTU
K = Ethernet/fiber optics: IEC 61850 communication / Modbus TCP / DNP3 UDP/TCP
L = Ethernet/fiber optics: Modbus TCP / DNP3 UDP/TCP
T = RS-485, Ethernet: IEC 61850 / Modbus TCP/RTU / DNP3 UDP/TCP/RTU

Mounting options

0 = Standard mount
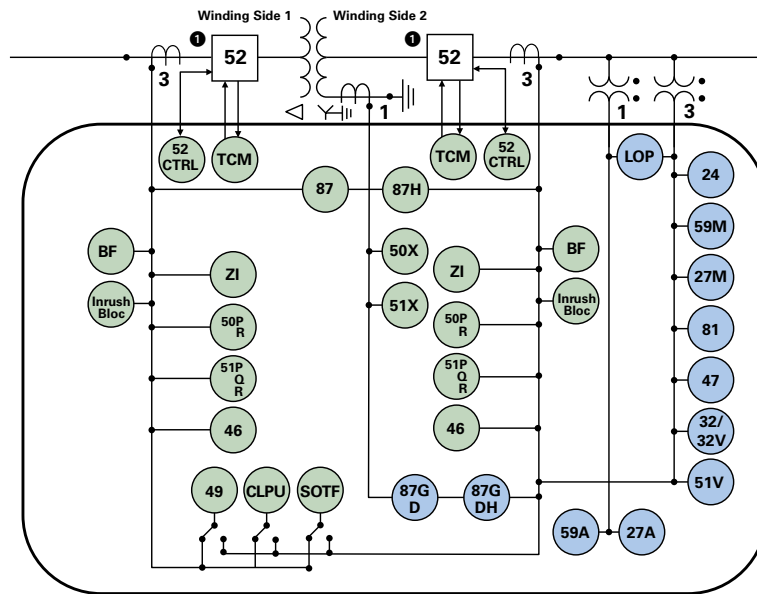**1** = Projection panel mount

Printed circuit board

B = Conformal coated

Eaton's transformer relay family–ETR Series

Model comparison guide–protective functions

ETR-4000	ETR-5000
Protection functions	The ETR-5000 has all of the same protection functions as the ETR-4000 with additional features.
46—Current unbalance elements	**Enhanced protection functions**
87R—Dual-slope percentage restrained current differential with magnetizing inrush and over-excitation blocking	**47**—Voltage unbalance elements
87H—Unrestrained current differential	**27M/59M**—Main three-phase under/overvoltage protection
87GD—Restricted ground fault / ground differential	**27A/59A**—Auxiliary single-phase under/overvoltage protection
50P—Instantaneous overcurrent elements with timers	**81**—Frequency elements that can be assigned to: overfrequency, underfrequency, rate of change or vector surge
50R—Instantaneous calculated elements with timers	**32**—Forward and reverse watts protection
50X—Instantaneous measured elements with timers	**32V**—Forward and reverse VARs protection
51P—Inverse time overcurrent elements	**24**—Over-excitation, volts-per-hertz protection
51Q—Negative sequence phase overcurrent elements	**86**—Lockout protection
51R—Inverse time overcurrent calculated elements	**51V**—Voltage restraint elements
51X—Inverse time overcurrent measured elements	**27T**—Low voltage ride-through (LVRT)
BF—Breaker failure elements	**27Q**—Reactive power and undervoltage
49—Temperature protection	**LOP**—Loss of potential
SOTF—Switch onto fault protection	
CLPU—Cold load pickup	
74TCM—Trip coil monitor	
ZI—Zone selective interlocking for bus protection	
BF—Breaker failure	

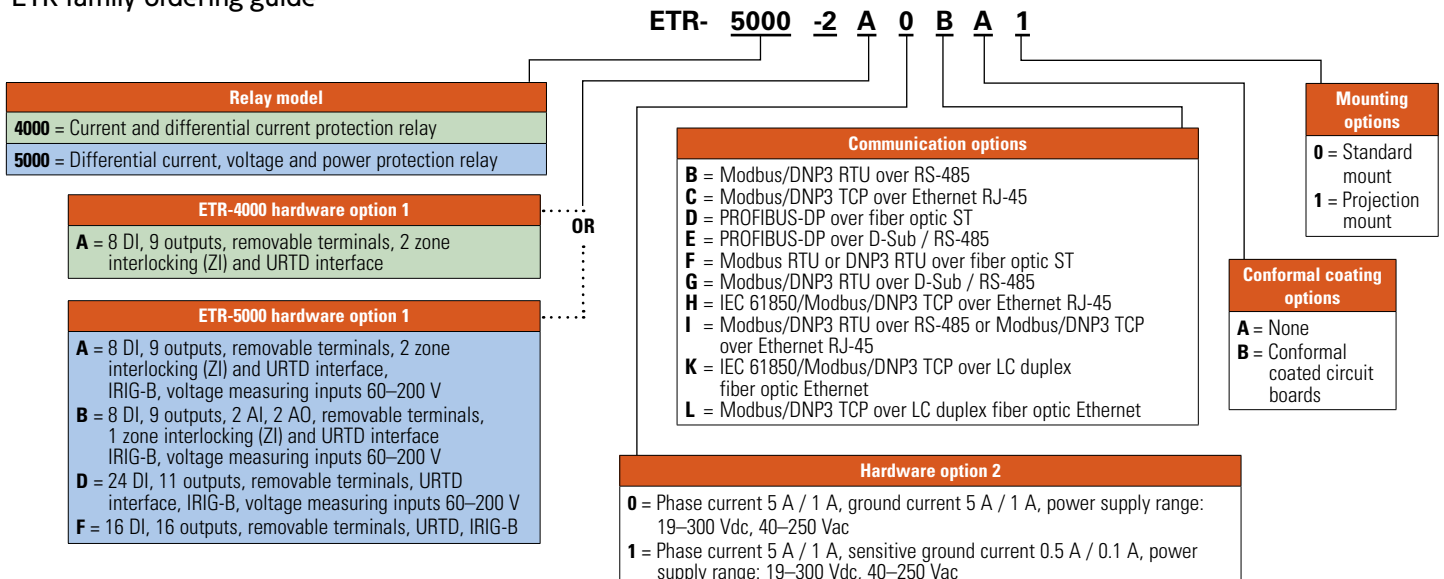## Typical one-line example—protection function guide

❶ 52—circuit breaker.

Protective elements key

🟩 = Functions on ETR-4000

🟦 = Functions on ETR-4000 and ETR-5000

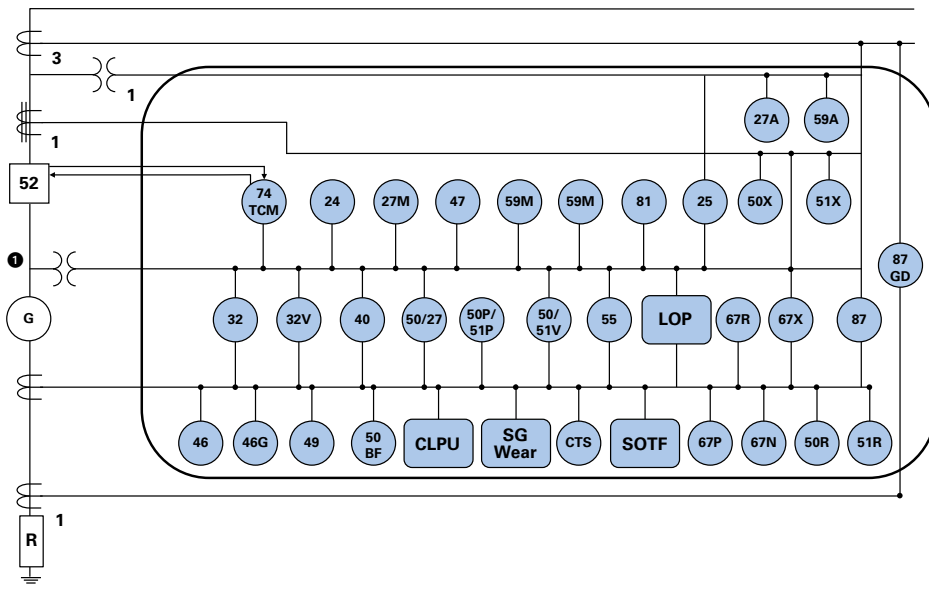See **Page 4** for metering features.

ETR family ordering guide

ETR- 5000 -2 A 0 B A 1

Relay model
4000 = Current and differential current protection relay
5000 = Differential current, voltage and power protection relay

ETR-4000 hardware option 1
A = 8 DI, 9 outputs, removable terminals, 2 zone interlocking (ZI) and URTD interface

ETR-5000 hardware option 1
A = 8 DI, 9 outputs, removable terminals, 2 zone interlocking (ZI) and URTD interface, IRIG-B, voltage measuring inputs 60–200 V
B = 8 DI, 9 outputs, 2 AI, 2 AO, removable terminals, 1 zone interlocking (ZI) and URTD interface IRIG-B, voltage measuring inputs 60–200 V
D = 24 DI, 11 outputs, removable terminals, URTD interface, IRIG-B, voltage measuring inputs 60–200 V
F = 16 DI, 16 outputs, removable terminals, URTD, IRIG-B

OR

Communication options
B = Modbus/DNP3 RTU over RS-485
C = Modbus/DNP3 TCP over Ethernet RJ-45
D = PROFIBUS-DP over fiber optic ST
E = PROFIBUS-DP over D-Sub / RS-485
F = Modbus RTU or DNP3 RTU over fiber optic ST
G = Modbus/DNP3 RTU over D-Sub / RS-485
H = IEC 61850/Modbus/DNP3 TCP over Ethernet RJ-45
I = Modbus/DNP3 RTU over RS-485 or Modbus/DNP3 TCP over Ethernet RJ-45
K = IEC 61850/Modbus/DNP3 TCP over LC duplex fiber optic Ethernet
L = Modbus/DNP3 TCP over LC duplex fiber optic Ethernet

Hardware option 2
0 = Phase current 5 A / 1 A, ground current 5 A / 1 A, power supply range: 19–300 Vdc, 40–250 Vac
1 = Phase current 5 A / 1 A, sensitive ground current 0.5 A / 0.1 A, power supply range: 19–300 Vdc, 40–250 Vac

Mounting options
0 = Standard mount
1 = Projection mount

Conformal coating options
A = None
B = Conformal coated circuit boards

Eaton's generator relay family–EGR Series

Model comparison guide–protective functions

EGR-5000

Protection functions

50BF—Breaker failure
50P—Phase instantaneous overcurrent elements
50R—Calculated ground or neutral instantaneous overcurrent elements
50X—Measured ground or neutral instantaneous overcurrent elements
51P—Phase overcurrent protection per time-current curve elements
51V—Voltage restraint elements
51R—Calculated ground fault protection per time-current curve elements
51X—Measured ground or neutral fault protection per time-current curve elements
49/51—Thermal protection element

67P/67R/67X—Directional overcurrent elements
46—Current unbalance elements
47—Voltage unbalance elements
27A/27M—Auxiliary and main three-phase undervoltage elements
59A/59M—Auxiliary and main three-phase overvoltage elements
59N—Ground fault overvoltage element
81U/O—Underfrequency and overfrequency elements
78V—Vector surge element
55A/55D—Apparent and displacement power factor elements
32—Forward and reverse watts elements
32V—Forward and reverse VARs elements
24—Over-excitation, volts-per-hertz
27T—Low voltage ride-through (LVRT)
27Q—Reactive power and undervoltage

(64S) 27TN/59N—Stator ground fault
46G—Generator unbalance
40—Loss of excitation
25—Sync check
79—Auto-reclosing
86—Lockout
LOP—Loss of potential
CLPU—Cold load pickup
SG Wear—Switchgear wear
SOTF—Switch on to fault
CTS—Current transformer supervision
74TCM—Trip coil monitor
ZI—Zone selective interlocking

87—Phase current differential protection
87H—Unrestrained high-set differential current protection
87GD—Restricted ground fault protection
87GDH—High set restricted ground fault protection
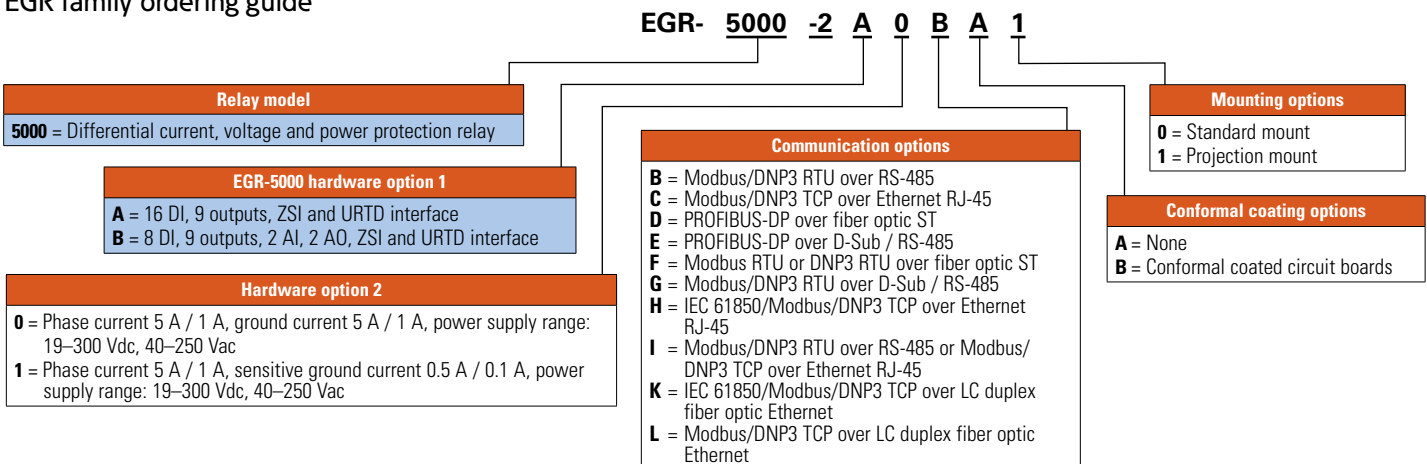**50/27**—Inadvertent energization

Typical one-line example—ANSI protective elements pictorial guide

❶ 52—circuit breaker.

Protective functions key

■ = EGR-5000 Functions

See **Page 4** for metering features.

EGR family ordering guide

EGR- **5000** **-2** **A** **0** **B** **A** **1**

Relay model

5000 = Differential current, voltage and power protection relay

EGR-5000 hardware option 1

A = 16 DI, 9 outputs, ZSI and URTD interface
B = 8 DI, 9 outputs, 2 AI, 2 AO, ZSI and URTD interface

Hardware option 2

0 = Phase current 5 A / 1 A, ground current 5 A / 1 A, power supply range: 19–300 Vdc, 40–250 Vac
1 = Phase current 5 A / 1 A, sensitive ground current 0.5 A / 0.1 A, power supply range: 19–300 Vdc, 40–250 Vac

Communication options

B = Modbus/DNP3 RTU over RS-485
C = Modbus/DNP3 TCP over Ethernet RJ-45
D = PROFIBUS-DP over fiber optic ST
E = PROFIBUS-DP over D-Sub / RS-485
F = Modbus RTU or DNP3 RTU over fiber optic ST
G = Modbus/DNP3 RTU over D-Sub / RS-485
H = IEC 61850/Modbus/DNP3 TCP over Ethernet RJ-45
I = Modbus/DNP3 RTU over RS-485 or Modbus/DNP3 TCP over Ethernet RJ-45
K = IEC 61850/Modbus/DNP3 TCP over LC duplex fiber optic Ethernet
L = Modbus/DNP3 TCP over LC duplex fiber optic Ethernet

Mounting options

0 = Standard mount
1 = Projection mount

Conformal coating options

A = None
B = Conformal coated circuit boards

Eaton's bus differential relay—EBR Series

Model comparison guide—protective functions

EBR-3000	EBR-Z (Required for protecting EBR-3000)
Protection functions **87**—Differential protection **87SV**—Open CT supervision **74TCM**—Trip coil monitor	**Protection functions** High-impedance and MOV protection for the EBR-3000 relay CT inputs

Typical one-line example—ANSI protective elements guide

Bus bar
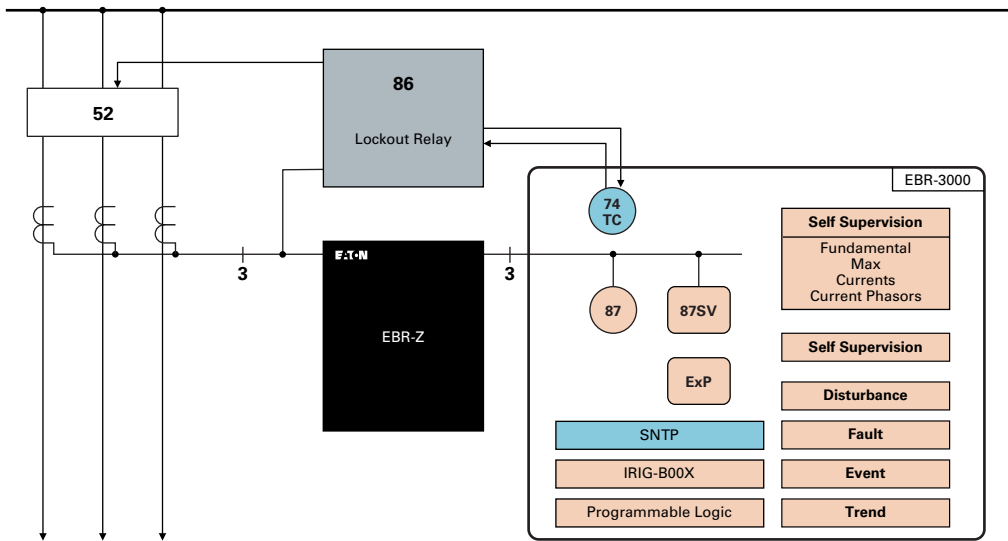
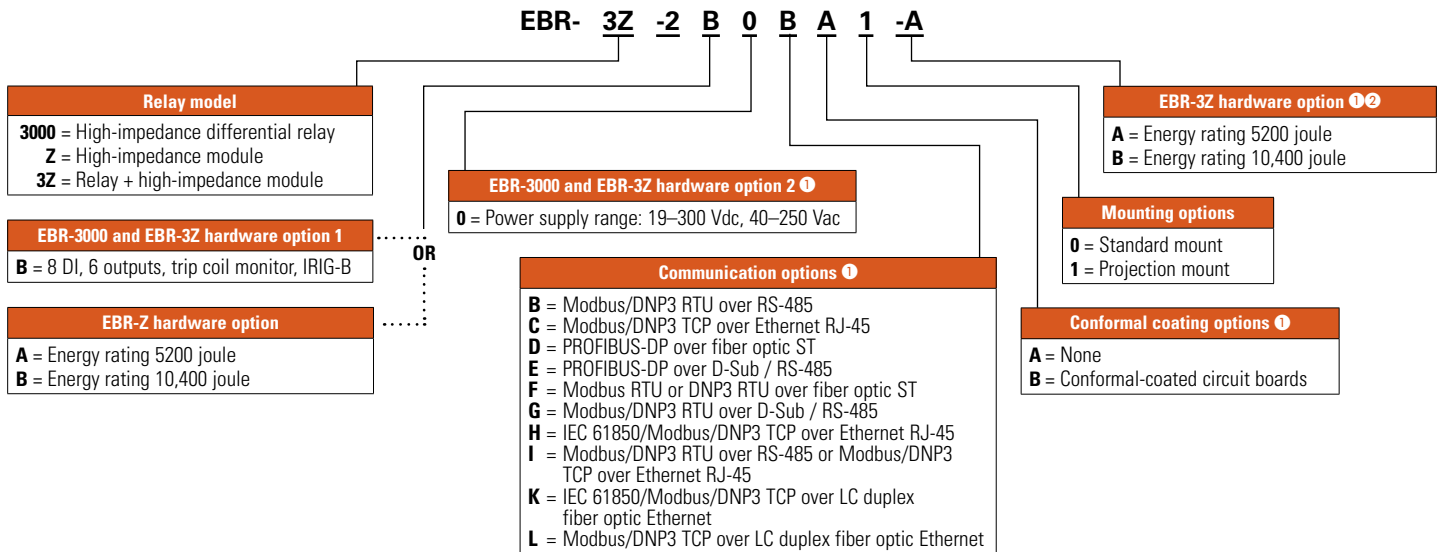**Protective elements key**

■ = Standard

■ = Option

See **Page 4** for metering features.

EBR family ordering guide

Separate mounting—both EBR-3000 and EBR-Z are required for operation

Group mounting—both EBR-3000 and EBR-Z are installed in one bezel

EBR- 3Z -2 B 0 B A 1 -A

Relay model
3000 = High-impedance differential relay
Z = High-impedance module
3Z = Relay + high-impedance module

EBR-3000 and EBR-3Z hardware option 1
B = 8 DI, 6 outputs, trip coil monitor, IRIG-B

EBR-Z hardware option
A = Energy rating 5200 joule
B = Energy rating 10,400 joule

OR

EBR-3000 and EBR-3Z hardware option 2 ❶
0 = Power supply range: 19–300 Vdc, 40–250 Vac

Communication options ❶
B = Modbus/DNP3 RTU over RS-485
C = Modbus/DNP3 TCP over Ethernet RJ-45
D = PROFIBUS-DP over fiber optic ST
E = PROFIBUS-DP over D-Sub / RS-485
F = Modbus RTU or DNP3 RTU over fiber optic ST
G = Modbus/DNP3 RTU over D-Sub / RS-485
H = IEC 61850/Modbus/DNP3 TCP over Ethernet RJ-45
I = Modbus/DNP3 RTU over RS-485 or Modbus/DNP3
   TCP over Ethernet RJ-45
K = IEC 61850/Modbus/DNP3 TCP over LC duplex
   fiber optic Ethernet
L = Modbus/DNP3 TCP over LC duplex fiber optic Ethernet

EBR-3Z hardware option ❶❷
A = Energy rating 5200 joule
B = Energy rating 10,400 joule

Mounting options
0 = Standard mount
1 = Projection mount

Conformal coating options ❶
A = None
B = Conformal-coated circuit boards

❶ Not applicable for EBR-Z catalog numbers.

❷ Not applicable for EBR-3000 catalog numbers.

Common software tools

Quality Manager is a powerful waveform and events analysis software tool. Quality Manager allows the user to review and customize the waveform disturbance records downloaded from any of the E-Series family models.

Features

- Zoom, scale and edit preferences for easy viewing and reporting

- 10 seconds maximum per record and 120 seconds total data storage (customizable)

- Select and group desired measurement channels for analysis

- Organize desired internal relay logic and I/O on the same timeline as the measurement channels for detailed sequence of events analysis

- Easily monitor the sampled values of the waveform record
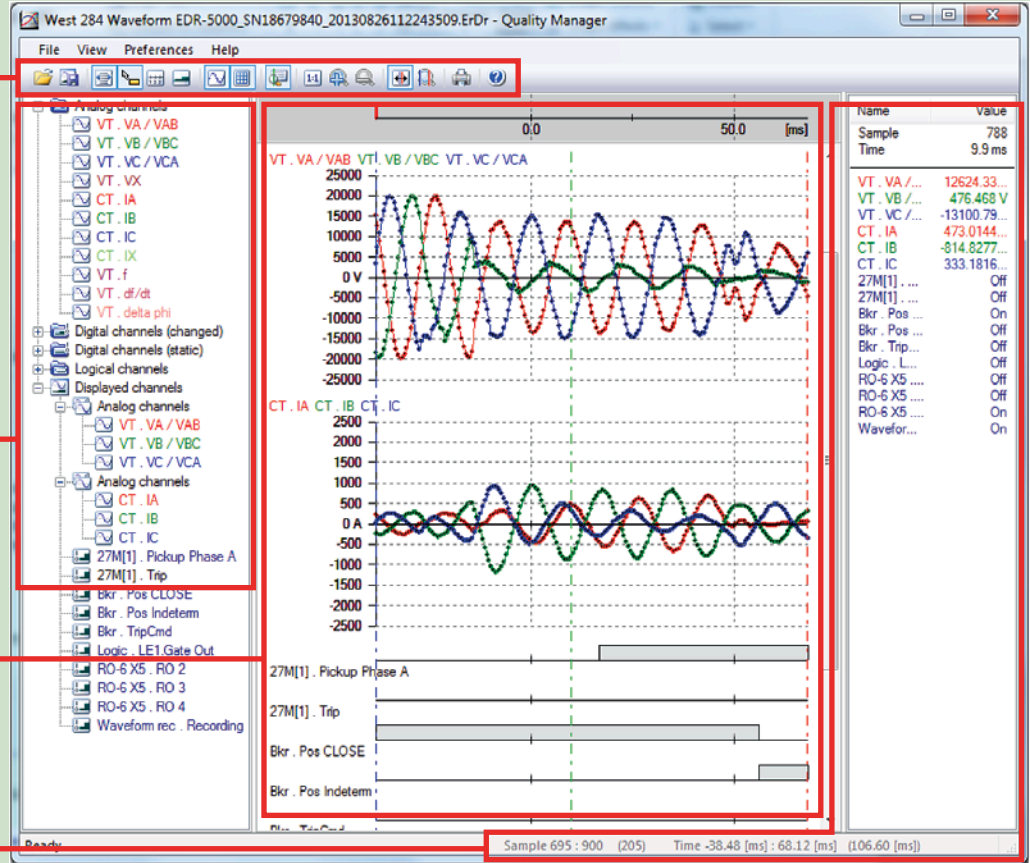
Download PowerPort-E software and device models including Quality Manager at **www.eaton.com/pr**

Relay Software Updates (Downloads)

E-Series relay family standard accessories

Description	Catalog number
Universal RTD module with Modbus RTU 48–240 Vac / 48–250 Vdc	**URTDII-01**
Universal RTD module with Modbus RTU 24–48 Vdc	**URTDII-02**
1 m fiber optic cable for EMR, ETR or EGR relays / URTD communications	**MPF0-1**
5 m fiber optic cable for EMR, ETR or EGR relays / URTD communications	**MPF0-5**
10 m fiber optic cable for EMR, ETR or EGR relays / URTD communications	**MPF0-10**
25 m fiber optic cable for EMR, ETR or EGR relays / URTD communications	**MPF0-25**
50 m fiber optic cable for EMR, ETR or EGR relays / URTD communications	**MPFO-50**
E-Series 3000 IQ adapter kit, projection mounted. For retrofitting MP and DT series relays to EMR-3000 and EDR-3000 relays	**ER-IQRETROKIT**
E-Series mini USB cable 6 ft	**ESERIESUSBCBL**
FP-5000 to EDR-5000 retrofit adapter plate projection mount	**ER-FP5KRETROKIT**

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