GE
Industrial Solutions

UL-Modular Catalog

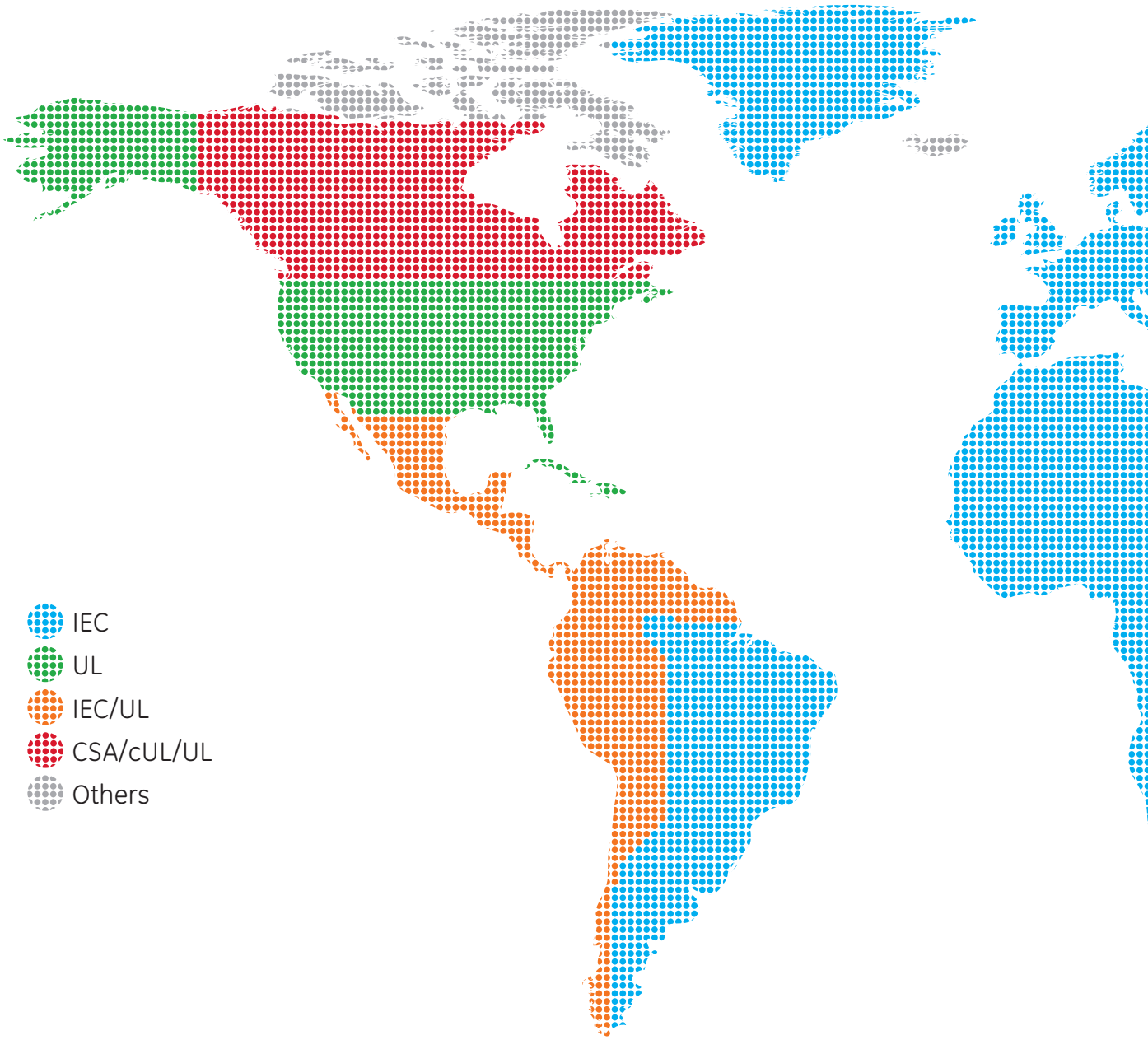
ElfaPlus* Modular DIN-rail devices with UL approval

www.geindustrial.com

ElfaPlus with UL approvals

Overview on world

UL and IEC differ fundamentally. The IEC standards for the IEC market merely specifies the minimum safety requirements of a device or system. Technical details of the safety requirements' constructional implementation are up to the manufacturers. In contrast, the standards for the American market are far more detailed. Depending on the standard, the required process may be monitored from product design to product production down to application, mounting and operation.

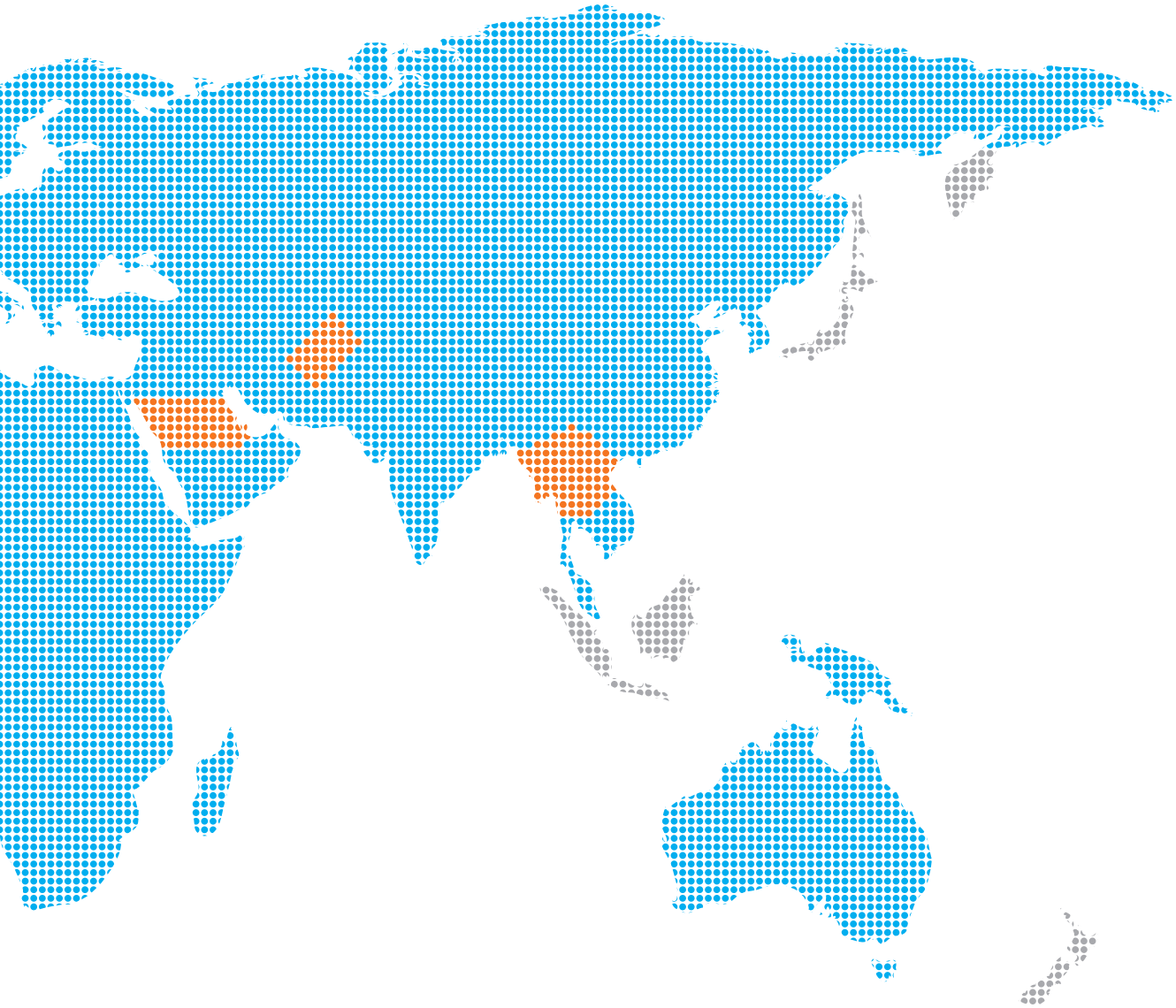


wide standards

The figure shows the influence areas where IEC or UL is unique in the market or has more influence on it. The current UL range that Industrial Solutions is showing in this catalog allows any OEM to work at a Global level in any market.

ElfaPlus UL range provides a wide range of:

- Circuit breakers
- Supplementary protection
- Ground fault protection devices
- Complete range of add-on devices for signaling, undervoltage, shunt trip and accessories
- Busbars system
- Surge protective devices for distribution panels and photovoltaic applications
- Multivoltage range of power analyzers in DIN-rail
- Power analyzers in door mounted format
- Powerful software to monitor any electrical parameter through Modbus net or Ethernet.



ElfaPlus with UL approvals

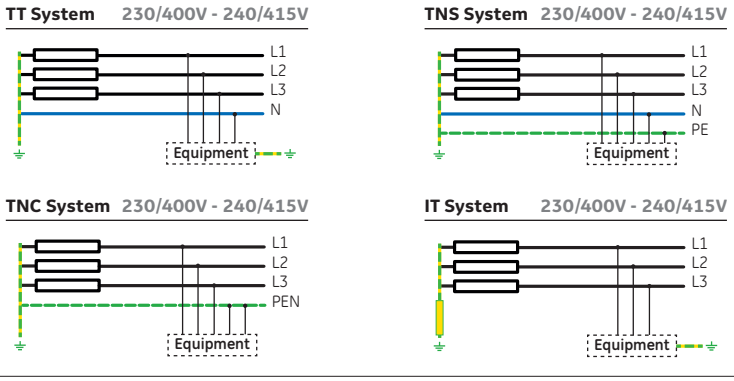
Line protection - DIN-rail circuit breakers and supplementary protection


O-OFF
O-OFF

IEC and UL
Voltage and distribution networks

Wiring diagrams according to IEC 60364-1

In case of IEC distribution networks, the GLOBAL MCB UL range is valid for all networks with rated voltage of 230/400V or 240/415V



Wiring diagrams according to ANSI C84.1

The majority of modern installations in both the US and Canada feature the following kind of power distribution system.

Single phase systems

Single phase
2 wires 120/240/277V

Split phase
3 wires 240/120V, 480/240V

Residential buildings

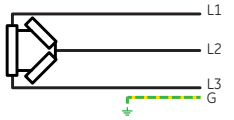
i.e. Single phase 240 (Ph-Ph)/120V (to GRND) Grounded midpoint

For example:

120V are used on the wall receptacle and 240V for ovens, ranges, air conditioning and laundry dryers.

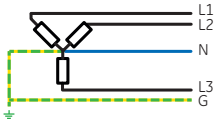
Three phase / Three wire systems

Delta 240/480/600V

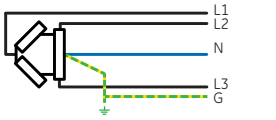


Three phase / Four wire systems

Grounded Wye(1)
208Y/120V, 480Y/277V, 600Y/347V



High-Leg Delta
240/120V HLD



Industrial and commercial buildings

(1) Y describes the solidly grounded circuit.

The value "Y" indicates the voltage between phases.

The value behind the slash indicates the voltage between phase and the grounding or neutral conductor.

The 277V ratings are not typical single phase voltage ratings encountered in residential applications, but they are quite often used in commercial and industrial settings to supply lighting loads in plants and buildings. In North America, predominant load switching requirements in power distribution networks involve 3 poles only. Protective devices can have combined slash and full ratings on their nameplates, such as 480V, 240V, 120V and 480Y/277V. The lower voltage rating in that case is considered the full rating, and the higher one would be the slash rating. The actual voltage rating in the application ultimately determines the type of power distribution network the protective device is suitable for (for example, 480V refers to a solidly grounded 480V network, i.e. 480Y/277V).

Standards for line protection devices

UL489

Defines rigorous testing requirements for circuit breakers in the United States. In the United States, Branch circuit protection devices must comply with the UL489/CSA C22.2 No.5 Standard for Molded-case Circuit Breakers.

UL1077

Defines supplementary protectors for use within electrical equipment protected by Branch circuit breakers.

CSA C22.2

The CSA (Canadian Standards Association) C22.2 standards closely correspond to the UL standards:

CSA C22.2 No.5-02

(harmonized to UL489/CSA C22.2 No.5) and CSA C22.2 No.235 (equivalent to UL1077). All UL rated devices also have the corresponding CSA rating, unless otherwise noted.

UL489A

Limited applications (DC circuits in communications equipment)

UL486 Standard - Connection terminals

Equipment wiring terminal for use with aluminium or copper conductors.

The UL486 standard applies to compression wiring connection terminals. It is a requirement for connections of a UL489/CSA C22.2 No.5 circuit breaker.

IEC 60947-2

International standards for circuit breakers to be used in industrial applications. In countries which follow the IEC standards, IEC 60947-2 is used for most industrial applications of circuit protection. IEC 60947-2 does not distinguish between the two levels of protection equivalent to UL489/CSA C22.2 No.5 circuit breakers and 1077 supplementary protectors.

IEC 60898-1

International standards for circuit breakers to be used in residential applications. It applies primarily to residential applications.

Marks and approvals for line protection devices

UL marks

For the marking of UL-certified products, a general differentiation is made between listed devices and recognized components. Further variants exist for the Canadian market. Recognized Component Mark: this mark consumers rarely see because it is specifically used on component parts that are part of a larger product or system. These components may have restrictions on their performance or may be incomplete in construction. The component recognition marking is found on a wide range of products, including some switches, power supplies, printed wiring boards, some kinds of industrial control equipment and thousands of other products. They shall only be installed by experts of the manufacturer according to the so-called “Conditions of Acceptability (CoA)” apply to these devices. Among others, our portfolio contains the following products with UR mark: Miniature Circuit Breakers and Add-on devices according to UL1077 and Surge protection devices according to UL1449 3rd edition.

This UL Recognized Component Mark, which became effective April 1, 1998, may be used on components certified by UL to both Canadian and U.S. requirements. Although UL had not originally planned to introduce a combined Recognized Component Mark, the popularity of the Canada/U.S. listing and classification marks among clients with UL certifications for both Canada and the United States has led to this mark.

C-UL US Listing Mark: UL introduced this listing mark in early 1998. It indicates compliance with both Canadian and U.S. requirements. The Canada/U.S. UL mark is optional. UL encourages those manufacturers with products certified for both countries to use this new, combined mark, but they may continue using separate UL marks for the United States and Canada. Our portfolio contains the following products with cULus mark: MCBs according UL489, Busbars and Power analyzers according to UL94.

Canadian mark

The CSA registered mark shows that a product has been independently tested and certified to meet recognized standards for safety or performance.

The CSA Group (formerly the Canadian Standards Association or CSA), is a not-for-profit standards organization which develops standards in 57 areas. CSA publishes standards in print and electronic form and provides training and advisory services. CSA is composed of representatives from industry, government, and consumer groups. The CSA mark may appear alone or with indicators. If it appears alone, it means that the product is certified for the Canadian market, to the applicable Canadian standards.

IEC marks

As a founding member of the IEC, the VDE German approval body works to promote internationally harmonized industry standards by way of approving safety of electricians’ handtools. The VDE mark indicates that a product has been tested and approved by VDE complying with IEC standards.

The recognized association for Belgian standards is the Belgium Electrotechnical Committee (CEB). The range of CEB standards is equal to IEC. The CEBEC mark showed in a device indicates that a product has been tested and approved by CEBEC complying with IEC standards.

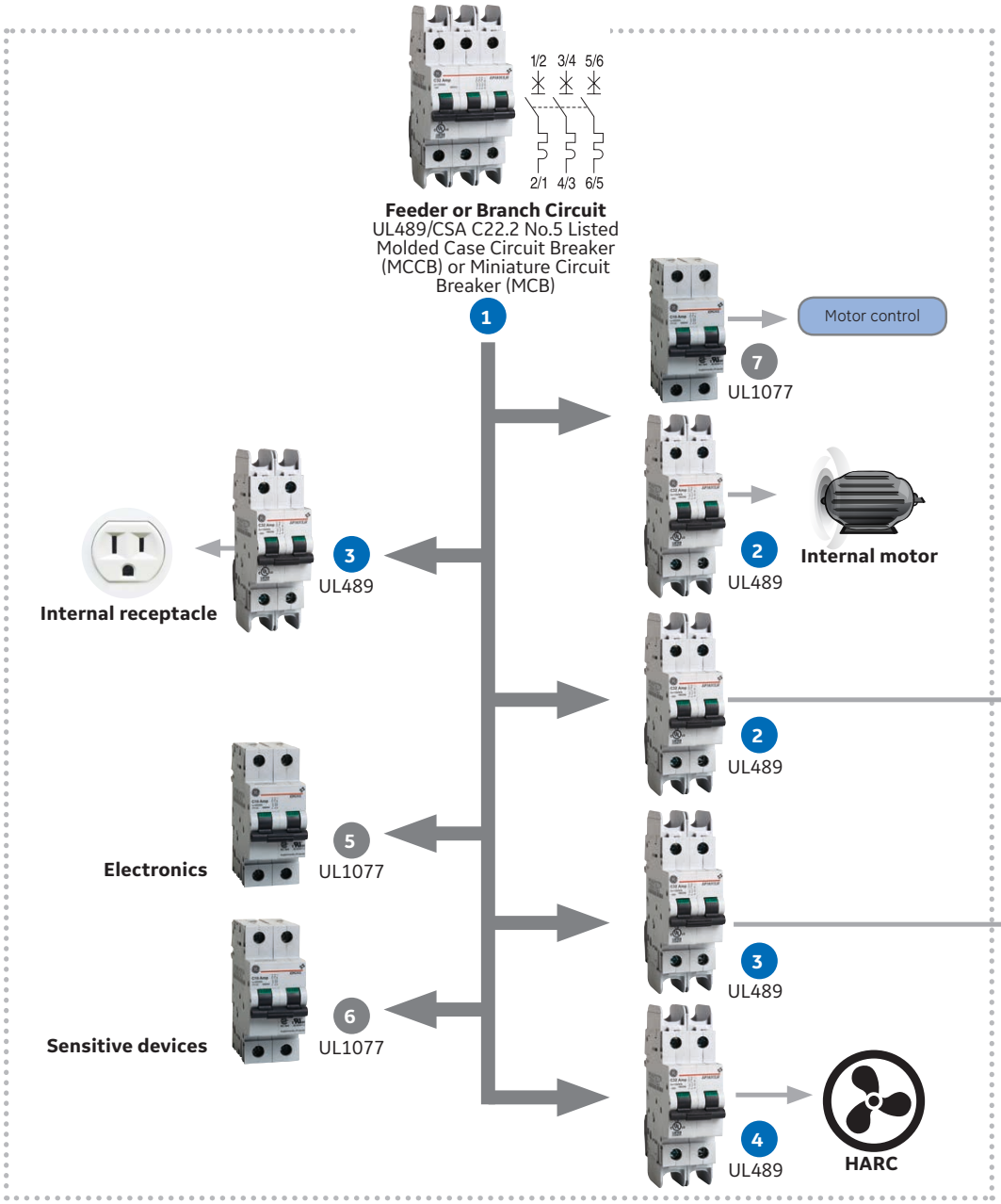
The CE symbol identifies a product that conforms to a European directive developed by a coalition of European countries that form the European Union (EU). This compliance is necessary for exporting certain cable types to countries within the European community.

New technical regulations and new mark of Conformity in the Russia, Kazakhstan and Belarus Customs Union for imports of machinery and industrial equipment.

China Compulsory Certificate mark commonly know as a CCC mark, is a compulsary safety mark for products imported, sold or used in the Chinese market.

OEM application guide. UL particularities for line protection

An OEM product as a whole must be appropriately protected from overcurrent conditions, either by connection in the field to a protected branch circuit (in accordance with NEC) or by inclusion of branch circuit protection within the product itself.



Equipment

Note: Simplified summary of UL standard.

1. **UL489** Protects conductors entering the OEM equipment. The device may be provided integral to the equipment or external as part of distribution system
2. **UL489** required to protect internal or external motors
3. **UL489** required to protect internal or external receptacle circuits
4. **UL489** required for HACR equipment (Heating, Air Conditioning and Refrigeration)
5. **UL1077** Supplementary protection for electronics inside the equipment
6. **UL1077** Supplementary protection on the load side of brand circuit to protect critical or sensitive internal circuits such as microprocessors communication, electronic controllers, power supplies
7. **UL1077** Supplementary protection permitted for motor control circuits only in the case transformers aren't in the circuit, if not UL489 required

Line protection devices: features, advantages and typical applications

Features

- New modular compact standard 35mm DIN-rail mount UL MCBs
- Complete range of UL489 and UL1077 miniature circuit breakers up to 63A
- Standard rating of 10kA at 480Y/277 Vac and 240/120Vac
- Suitable for branch circuit device protection
- Module width of only 0.71 in (18 mm) per pole
- Contact position indication (red/green)
- Possibility for locking the toggle in OFF position
- Complete range of UL1077 auxiliaries, shunt trips and undervoltage
- Bifunctional (wires & bars) strong terminals. UL489 busbars available in the range.
- The UL MCB range is completed with ground fault devices, surge protective devices and net analyzers.

Typical applications

- Branch circuit protection
- Convenience receptable circuit (internal/external)
- Motor control circuit
- Load circuit leaving the equipment (external)
- HACR equipment: heating, air conditioning, refrigeration (internal/external)
- Power supplies
- Control instrumentation
- Relays
- UPS
- Power conditioners

Advantages

ElfaPlus circuit breakers and supplementary protectors provide several advantages which are important to OEMs and global players in the electrical contractors market. These include:

- **Small, compact size**
- **Easy installation on DIN-rails**
- **Limits let through current**
- **Resetability, more convenient than fuses**
- **Electrical auxiliaries for control and status information**
- **Extensive variety of accessories**
- **Better protection** - ElfaPlus supplementary protectors and miniature circuit breakers limit let through current, providing faster separation of the component from the fault, thereby reducing system damage.
- **More selection** - More ratings compatible with low-power electronic circuits are available in the range from 0.5 to 10 A.
- **Reduction of nuisance tripping** - Available with different trip characteristics to meet the system needs: B, C and D curves, depending on the model.
- **Simple installation** - The ElfaPlus products mount easily onto a 35 mm DIN mounting rail.
- **Reverse feeding** - Reverse feeding of line power is permitted.
- **Reliability** - Each EP miniature circuit breaker has an endurance of 10000 operation cycles and voltage withstand of 6000V impulse rating.
- **Worldwide availability** - The ElfaPlus products are available and supported throughout the world by GE Industrial Solutions.

Technical data: Line protection devices

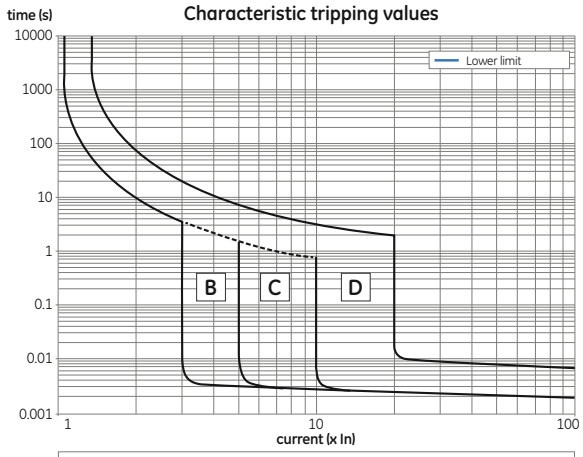
Series			EP100ULH34	EP100ULH12	EP100UL	EP60UL
Standards UL489 (listed) & CSA c22.2 No.5-02			yes	yes	-	-
Standards UL1077 (recognized) & CSA C22.2 No.235			-	-	yes	yes
Certifications UL489 (listed) & CSA c22.2 No.5-02			E256870	E256870	-	-
Certifications UL1077 (recognized) & CSA c22.2 No.235			-	-	E151139/235-04	E151139/235-04
Nominal voltage acc. UL & CSA	AC/DC	1P	277AC/60DC	120AC/60DC	277AC/50DC	277AC/50DC
		2P	480AC/125DC	240AC/125DC	480AC/110DC	480AC/110DC
		3P	480AC	240AC	480AC	480AC
		4P	-	-	480AC	480AC
Rated current at 77°F (25°C)			B: 5-40, C,D: 0.5-40	B: 5-40, C,D: 0.5-63	B: 5-40, C,D: 0.5-63	B: 5-40, C,D: 0.5-63
Number of poles			1,2,3	1,2,3	1,2,3,4	1,2,3,4
Reference temperature °F/°C			77/25	77/25	77/25	77/25
UL486 Standard compliance-connection terminals			UL486A and B	UL486A and B	UL486E	UL486E
Terminal capacity	60/75°C		14-2 AWG	14-2 AWG	14-2 AWG	14-2 AWG
Torque N.m/lbs.in			4/30	4/30	4.5/39.9	4.5/39.9
Handle end position selectable			yes	yes	yes	yes
Mounting			35 mm DIN-rail	35 mm DIN-rail	35 mm DIN-rail	35 mm DIN-rail
Nomenclature			Circuit breaker	Circuit breaker	Supplementary protectors	Supplementary protectors
Frequency Hz			50/60	50/60	50/60	50/60
Standards EN/IEC 60947-2			yes	yes	yes	yes
Calibration temperature °F/°C 60947-2			122/50	122/50	122/50	122/50
Number of modules			1, 2, 3	1, 2, 3	1, 2, 3, 4	1, 2, 3, 4
Nominal rated voltage 60947-2						
	AC	1P V	240/415	240/415	240/415	240/415
		2P V	415	415	415	415
		3P V	415	415	415	415
		4P V	-	-	415	415
	DC 1P[1] VDC		60	60	50	50
	2P (in series)[1] VDC		125	125	110	110
Minimum rated service voltage		V	12	12	12	12
Selectivity class (IEC 60898-1)			-	-	3	3
Isolator application IEC 60947-2			yes	yes	yes	yes
Rated insulation voltage	Pollution degree 2	V	500	500	500	500
	Pollution degree 3	V	440	440	440	440
Impulse withstand test voltage		kV	6	6	6	6
Insulation resistance		MOhm	10000	10000	10000	10000
Dielectric rigidity		kV	2.5	2.5	2.5	2.5
Mounting position			Any	Any	Any	Any
Incoming top or bottom			Any	Any	Any	Any
Vibrations resistance (in x, y, z direction) (IEC 77/16.3)			3g	3g	3g	3g
Number of Operations	electrical at nom. voltage/amperage		10000	10000	10000	10000
	mechanical		20000	20000	20000	20000
Utilization category (IEC 60947-2)			A	A	A	A
Protection distance (IEC 60947-2)		in./mm	0.47/12	0.47/12	0.47/12	0.47/12
Protection degree (outside / inside enclosure with door)			IP20/IP40	IP20/IP40	IP20/IP40	IP20/IP40
Self-extinguish degree (according to UL94)			V0	V0	V0	V0
Humidity (according to IEC 60068-2 / DIN 40046)		°F(°C)/RH	131°F(+55°C)/95%RH	131°F(+55°C)/95%RH	131°F(+55°C)/95%RH	131°F(+55°C)/95%RH
Operating temperature		°F(°C)	-40°F(-40°C)/ 131°F(+55°C)	-40°F(-40°C)/ 131°F(+55°C)	-13°F(-25/ (131°F)+55	(-13°F)-25/ (131°F)+55
Storage temperature		°F(°C)	-67°F(-55°C)/ 131°F(+55°C)	-67°F(-55°C)/ 131°F(+55°C)	-67°F(-55°C)/ 131°F(+55°C)	-67°F(-55°C)/ 131°F(+55°C)
Terminal capacity (combined at both ends)						
Rigid cable min/max (top)		AWG(mm²)	17/2(1/35)	17/2(1/35)	17/2(1/35)	17/2(1/35)
Flexible cable min*/max (top)		AWG(mm²)	18/4(0.75/25)	18/4(0.75/25)	18/4(0.75/25)	18/4(0.75/25)
Rigid cable min/max (bottom)		AWG(mm²)	17/2(1/35)	17/2(1/35)	17/2(1/35)	17/2(1/35)
Flexible cable min*/max (bottom)		AWG(mm²)	18/4(0.75/25)	18/4(0.75/25)	18/4(0.75/25)	18/4(0.75/25)
(*Flexible cable 18...14 AWG (0.75/1/1.5 mm²) with cable lug)						
Maximum torque		Nm/lbs.in	max 4.5/39.8	max 4.5/39.8	max 4.5/39.8	max 4.5/39.8
Add-on devices auxiliary contacts			yes	yes	yes	yes
(side add-on) Tele L			yes	yes	yes	yes
Tele MP			yes	yes	yes	yes
Dimensions in.(mm)		(HxDxW) in/mm/mod.	3.4(86) x 2.7(68) x W[2] 0.71/18	3.4(86) x 2.7(68) x W[2] 0.71/18	3.4(86) x 2.7(68) x W[2] 0.71/18	3.4(86) x 2.7(68) x W[2] 0.71/18
Weight/mod.		oz./ g.	4.2/130	4.2/130	4.2/130	4.2/130
Approvals			UL Listed, CEBEC, CSA, EAC	UL Listed, CEBEC, CSA, EAC	UL , VDE, CSA, EAC	UL , VDE, CSA, EAC
CE-marking			yes	yes	yes	yes
ROHS			yes	yes	yes	yes
Page			A.12	A.14	A.16	A.18

(1) Preferred values of rated control supply voltage (IEC 60947-2): 24V DC, 48V DC, 110V DC, 125V DC, 220V DC, 250V DC
(2) EP100ULH 1P, 2P & 3P: H = 4.6 in. (116mm)

MCBs Short-circuit capacity

Series		EP100ULH34	EP100ULH12	EP100UL34	EP60UL34
Interrupting ratings as per (kA):		UL489	UL489	UL1077	UL1077
UL	1P/2P 277V AC	10	-	10	6
	3P 480V AC	10	-	10	6
	1P 120V AC	10	10	10	6
	2P/3P 240V AC	10	10	10	6
	1P 60V DC (50V DC: EP..UL34)	10	10	10	6
	2P 125V DC (110V DC: EP..UL34)	10	10	10	6
Interrupting capacity acc. to kA					
EN/IEC 60947-2	Icu (ultimate) kA				
	1 P 127V	30	30	30	20
	240V	15	15	15	10
	415V	4	4	4	3
	2P 127V	40	40	40	30
	240V	30	30	30	20
	2 P 415V	15	15	15	10
	3/4P 240V	30	30	30	20
	415V	15	15	15	10
	440V	10	10	10	6
	Ics (service)	50% Icu	50% Icu	50% Icu	75% Icu
Short-circuit capacity DC					
EN/IEC 60947-2	Icu (ultimate) kA				
	1 P ≤ 60V	25	25	25	20
	≤ 220V	-	-	-	-
	2 P ≤ 125V	30	30	30	25
	≤ 440V	-	-	-	-
	Ics (service)	10% Icu	10% Icu	100% Icu	100% Icu

Characteristic tripping values



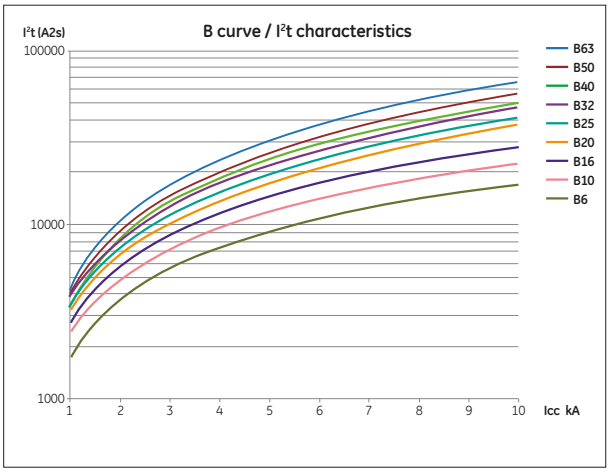
Tripping characteristic acc. to UL 489

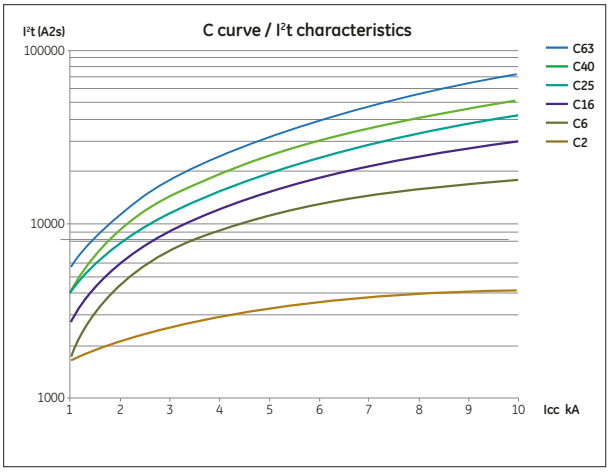
1. Conventional non tripping current
   Rated Current = 1.0 (T= 25°C)
2. Conventional tripping current
   Rated Current = 1.35 In t<1h (T= 25°C)
3. 2.0 In (T= 25°C)
   0.5A < Rated Current ≤ 30A t < 120s
   30A < Rated Current ≤ 50A t < 240s
   50A < Rated Current ≤ 63A t < 360s

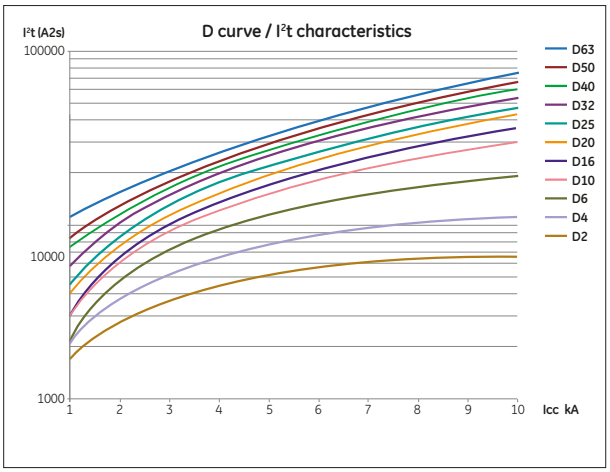
Instantaneous tripping acc. to IEC 60898-1

Type B
3 Rated Current t > 0.1s
5 Rated Current t < 0.1s
Type C
5 Rated Current t > 0.1s
10 Rated Current t < 0.1s
Type D
3 Rated Current t > 0.1s
5 Rated Current t < 0.1s

Let-through I²t values







Internal resistances and power losses per pole, loads with rated current

Power losses - Series EP100ULH

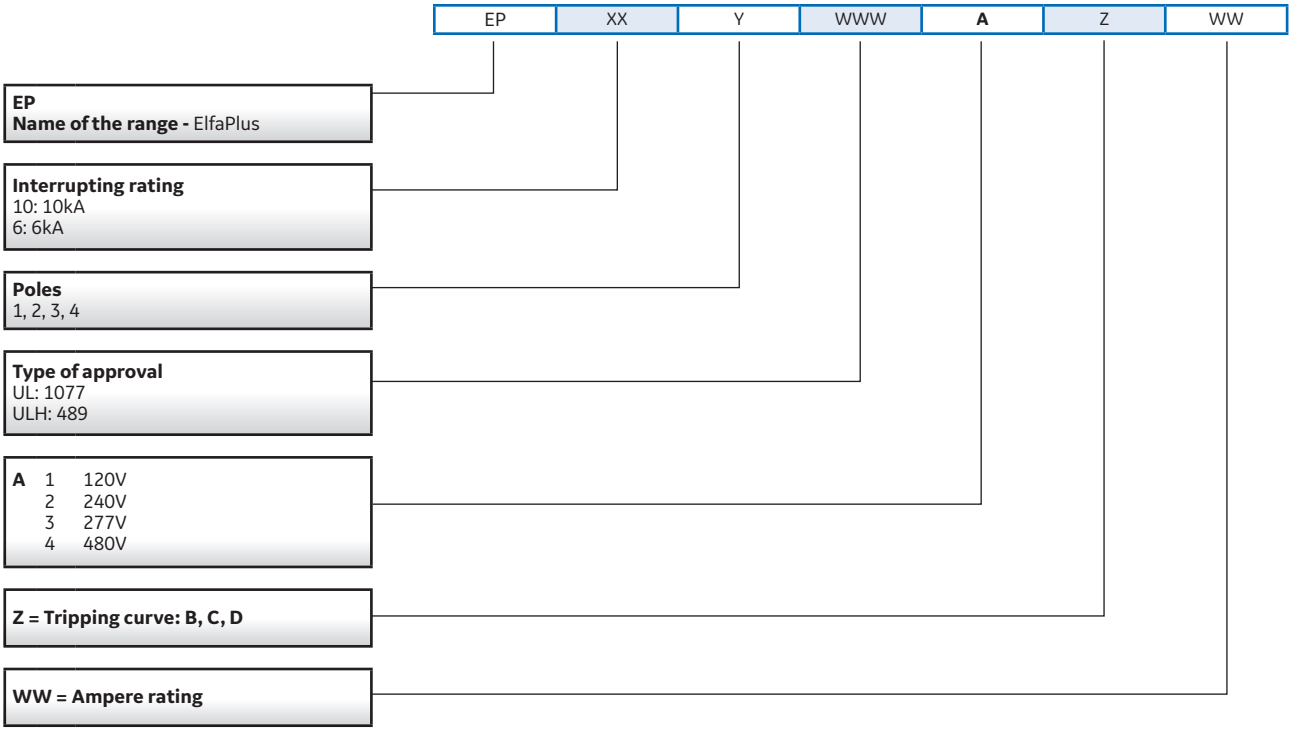
	B curve - Power loss (W)			C-D curve - Power loss (W)		
Rated Current (A)	1P	2P	3P	1P	2P	3P
0.5	-	-	-	1.18	2.35	3.53
1	-	-	-	1.33	2.67	4.00
2	-	-	-	1.30	2.60	3.91
3	-	-	-	1.64	3.28	4.91
4	-	-	-	1.56	3.13	4.69
5	1.65	3.30	4.95	1.65	3.30	4.95
6	1.65	3.30	4.95	1.65	3.30	4.95
8	1.30	2.60	3.91	1.30	2.60	3.91
10	1.64	3.28	4.91	1.64	3.28	4.91
13	2.11	4.22	6.33	2.11	4.22	6.33
15	2.70	5.40	8.10	2.70	5.40	8.10
16	2.70	5.40	8.10	2.70	5.40	8.10
20	2.90	5.80	8.69	2.90	5.80	8.69
25	3.35	6.70	10.05	3.35	6.70	10.05
30	3.22	6.45	9.67	3.22	6.45	9.67
32	3.22	6.45	9.67	3.22	6.45	9.67
35	3.57	7.14	10.71	3.57	7.14	10.71
40	4.20	8.40	12.60	4.20	8.40	12.60
50	4.73	9.45	14.18	4.73	9.45	14.18
60	5.42	10.84	16.25	5.42	10.84	16.25
63	5.42	10.84	16.25	5.42	10.84	16.25

ElfaPlus line Miniature Circuit Breakers ULH[1] and UL[2] product number

Catalog number guide for ElfaPlus line Miniature Circuit Breakers
(Catalog number for illustrative purposes only)

Examples

EP61ULC02	EP	6	1	UL	-	C	02
EP62ULC32	EP	6	2	UL	-	C	30
EP101ULD16	EP	10	1	UL	-	D	15
EP102ULD30	EP	10	2	UL	-	D	30
EP101ULH1B15	EP	10	1	ULH	**1**	B	15
EP103ULH2C15	EP	10	3	ULH	**2**	C	15
EP101ULH3B15	EP	10	1	ULH	**3**	B	15
EP103ULH4C15	EP	10	3	ULH	**4**	C	15



(1) Circuit breakers
(2) Supplementary protection

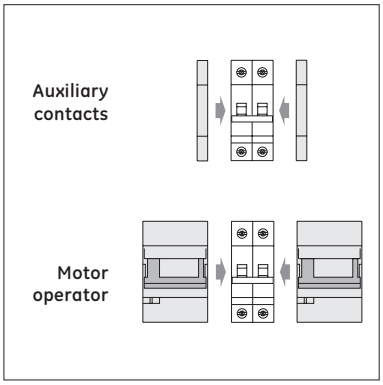
Application

Standards

UL489, CSA c22.2 No.5-02
IEC 60947-2, IEC 60898-1

Approvals / Marking

Add-on devices



(1) Ask for availability. Under Type approval.

EP100 ULH (Branch circuit protection)

UL Listed 489 **10kA**
CSA c22.2 No.5-02
EN/IEC 60947-2 **15kA**

277/480Vac

UL Listed 489 performances

UL FILE		E256870
Ampere rating (A) 0.5-63		0.5-40A
Reference temperature	°F/°C	77/25
Terminal capacity flexible/rigid cable		14-2 AWG
Max. Torque N.m/lbs.in		4.5/39.8

Rated voltage (V)

Poles	V AC	V DC
1	277	60
2,3	480	125

AC Interrupting ratings

Poles	V	kA
1	277	10
2,3	480	10

DC Interrupting ratings

Poles	V DC	kA
1	60	10
2	125	10

IEC performances

Thermal setting rated current		0.5-40A
Rated voltage AC	(V)	240/415V
Weight/pole	oz.(g)	4.6(130)
Terminal capacity flexible/rigid cable	(mm^2)	0.75/1- 25/35

Short-circuit capacity according to IEC 60947-2

Poles	V AC	Icu (kA)
1	127	30
	240	15
	415	4
2	127	40
	240	30
	415	15
3	240	30
	415	15
	440	10

DC short-circuit capacity according to IEC 60497-2

Poles	V	Icc(kA)
1	60	25
2	125	30

General performance

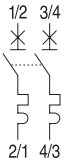
Minimum operating voltage		12
Tripping characteristics		B-C-D
Rated frequency	(Hz)	50/60
Mechanical/electrical endurance		20000/10000
Humidity acc. to IEC 60068-2-28/2-30		95%RH at 131°F/55°C
Poles		1, 2, 3

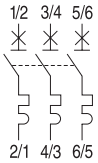
Instantaneous tripping ranges acc. to IEC 60898-1
B characteristic 3 to 5 times Ampere rating
C characteristic 5 to 10 times Ampere rating
D characteristic 10 to 20 times Ampere rating

ElfaPlus with UL approvals

UL489 - Series EP100 ULH - 10kA - characteristics B-C-D

		B curve	C curve	D curve	
	(A)	Cat. No.	Cat. No.	Cat. No.	Pack.
1P	0.5	-	EP101ULH3C0.5▲	EP101ULH3D0.5▲	6
	1	-	EP101ULH3C01▲	EP101ULH3D01▲	6
	2	-	EP101ULH3C02▲	EP101ULH3D02▲	6
	3	-	EP101ULH3C03▲	EP101ULH3D03▲	6
	4	-	EP101ULH3C04▲	EP101ULH3D04▲	6
	5	EP101ULH3B05▲	EP101ULH3C05▲	EP101ULH3D05▲	6
	6	EP101ULH3B06▲	EP101ULH3C06▲	EP101ULH3D06▲	6
	8	EP101ULH3B08▲	EP101ULH3C08▲	EP101ULH3D08▲	6
	10	EP101ULH3B10▲	EP101ULH3C10▲	EP101ULH3D10▲	6
	13	EP101ULH3B13▲	EP101ULH3C13▲	EP101ULH3D13▲	6
	15	EP101ULH3B15▲	EP101ULH3C15▲	EP101ULH3D15▲	6
	16	EP101ULH3B16▲	EP101ULH3C16▲	EP101ULH3D16▲	6
	20	EP101ULH3B20▲	EP101ULH3C20▲	EP101ULH3D20▲	6
	25	EP101ULH3B25▲	EP101ULH3C25▲	EP101ULH3D25▲	6
	30	EP101ULH3B30▲	EP101ULH3C30▲	EP101ULH3D30▲	6
	32	EP101ULH3B32▲	EP101ULH3C32▲	EP101ULH3D32▲	6
	35	EP101ULH3B35▲	EP101ULH3C35▲	EP101ULH3D35▲	6
	40	EP101ULH3B40▲	EP101ULH3C40▲	EP101ULH3D40▲	6
2P	0.5	-	EP102ULH4C0.5▲	EP102ULH4D0.5▲	3
	1	-	EP102ULH4C01▲	EP102ULH4D01▲	3
	2	-	EP102ULH4C02▲	EP102ULH4D02▲	3
	3	-	EP102ULH4C03▲	EP102ULH4D03▲	3
	4	-	EP102ULH4C04▲	EP102ULH4D04▲	3
	5	EP102ULH4B05▲	EP102ULH4C05▲	EP102ULH4D05▲	3
	6	EP102ULH4B06▲	EP102ULH4C06▲	EP102ULH4D06▲	3
	8	EP102ULH4B08▲	EP102ULH4C08▲	EP102ULH4D08▲	3
	10	EP102ULH4B10▲	EP102ULH4C10▲	EP102ULH4D10▲	3
	13	EP102ULH4B13▲	EP102ULH4C13▲	EP102ULH4D13▲	3
	15	EP102ULH4B15▲	EP102ULH4C15▲	EP102ULH4D15▲	3
	16	EP102ULH4B16▲	EP102ULH4C16▲	EP102ULH4D16▲	3
	20	EP102ULH4B20▲	EP102ULH4C20▲	EP102ULH4D20▲	3
	25	EP102ULH4B25▲	EP102ULH4C25▲	EP102ULH4D25▲	3
	30	EP102ULH4B30▲	EP102ULH4C30▲	EP102ULH4D30▲	3
	32	EP102ULH4B32▲	EP102ULH4C32▲	EP102ULH4D32▲	3
	35	EP102ULH4B35▲	EP102ULH4C35▲	EP102ULH4D35▲	3
	40	EP102ULH4B40▲	EP102ULH4C40▲	EP102ULH4D40▲	3
3P	0.5	-	EP103ULH4C0.5▲	EP103ULH4D0.5▲	2
	1	-	EP103ULH4C01▲	EP103ULH4D01▲	2
	2	-	EP103ULH4C02▲	EP103ULH4D02▲	2
	3	-	EP103ULH4C03▲	EP103ULH4D03▲	2
	4	-	EP103ULH4C04▲	EP103ULH4D04▲	2
	5	EP103ULH4B05▲	EP103ULH4C05▲	EP103ULH4D05▲	2
	6	EP103ULH4B06▲	EP103ULH4C06▲	EP103ULH4D06▲	2
	8	EP103ULH4B08▲	EP103ULH4C08▲	EP103ULH4D08▲	2
	10	EP103ULH4B10▲	EP103ULH4C10▲	EP103ULH4D10▲	2
	13	EP103ULH4B13▲	EP103ULH4C13▲	EP103ULH4D13▲	2
	15	EP103ULH4B15▲	EP103ULH4C15▲	EP103ULH4D15▲	2
	16	EP103ULH4B16▲	EP103ULH4C16▲	EP103ULH4D16▲	2
	20	EP103ULH4B20▲	EP103ULH4C20▲	EP103ULH4D20▲	2
	25	EP103ULH4B25▲	EP103ULH4C25▲	EP103ULH4D25▲	2
	30	EP103ULH4B30▲	EP103ULH4C30▲	EP103ULH4D30▲	2
	32	EP103ULH4B32▲	EP103ULH4C32▲	EP103ULH4D32▲	2
	35	EP103ULH4B35▲	EP103ULH4C35▲	EP103ULH4D35▲	2
	40	EP103ULH4B40▲	EP103ULH4C40▲	EP103ULH4D40▲	2

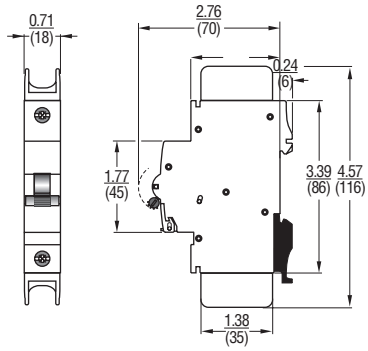




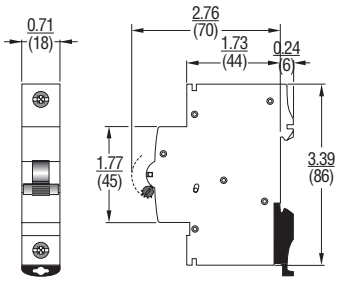
▲ Stocked in Mt. Juliet Distribution Center. Subject to change.

Dimensional drawings in.(mm)

Series EP ULH



Series EP



EP100 ULH (Branch circuit protection)

UL Listed 489 **10kA**
CSA c22.2 No.5-02
EN/IEC 60947-2 **15kA**

120/240Vac

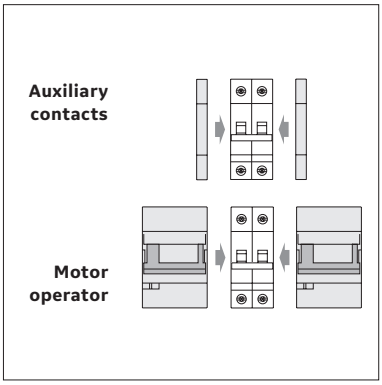
Application

Standards

UL489, CSA c22.2 No.5-02
IEC 60947-2, IEC 60898-1

Approvals / Marking

Add-on devices



(1) Ask for availability. Under Type approval.

UL Listed 489 performances

UL FILE		E256870
Ampere rating In (A) 0.5-63		0.5-63A
Reference temperature	°F/°C	77/25
Terminal capacity flexible/rigid cable		14-2 AWG
Max. Torque N.m/lbs.in		4.5/39.8

Rated voltage (V)

Poles	V AC	V DC
1	120	60
2,3	240	125

AC Interrupting ratings

Poles	V	kA
1	120	10
2,3	240	10

DC Interrupting ratings

Poles	V DC	kA
1	60	10
2	125	10

IEC performances

Thermal setting In		0.5-63A
Rated voltage AC	(V)	240/415V
Weight/pole	oz.(g)	4.6(130)
Terminal capacity flexible/rigid cable	(mm^2)	0.75/1 - 25/35

Short-circuit capacity according to IEC 60947-2

Poles	V AC	Icu (kA)
1	127	30
	240	15
	415	4
2	127	40
	240	30
	415	15
3	240	30
	415	15
	440	10

DC short-circuit capacity according to IEC 60497-2

Poles	V	Icu (kA)
1	60	25
2	125	30

General performance

Minimum operating voltage		12
Tripping characteristics		B-C-D
Rated frequency	(Hz)	50/60
Mechanical/electrical endurance		20000/10000
Humidity acc. to IEC 60068-2-28/2-30		95%RH at 131°F/55°C
Poles		1, 2, 3

Instantaneous tripping ranges acc. to IEC 60898-1
B characteristic 3 to 5 times Ampere rating
C characteristic 5 to 10 times Ampere rating
D characteristic 10 to 20 times Ampere rating

UL489 - Series EP100 ULH - 10kA - characteristics B-C-D

		B curve	C curve	D curve	
	(A)	Cat. No.	Cat. No.	Cat. No.	Pack.
1P	0.5	-	EP101ULH1C0.5▲	EP101ULH1D0.5	6
	1	-	EP101ULH1C01▲	EP101ULH1D01	6
	2	-	EP101ULH1C02▲	EP101ULH1D02▲	6
	3	-	EP101ULH1C03▲	EP101ULH1D03▲	6
	4	-	EP101ULH1C04▲	EP101ULH1D04	6
	5	EP101ULH1B05▲	EP101ULH1C05▲	EP101ULH1D05	6
	6	EP101ULH1B06▲	EP101ULH1C06▲	EP101ULH1D06	6
	8	EP101ULH1B08▲	EP101ULH1C08	EP101ULH1D08▲	6
	10	EP101ULH1B10▲	EP101ULH1C10▲	EP101ULH1D10▲	6
	13	EP101ULH1B13	EP101ULH1C13▲	EP101ULH1D13	6
	15	EP101ULH1B15▲	EP101ULH1C15▲	EP101ULH1D15▲	6
	16	EP101ULH1B16	EP101ULH1C16▲	EP101ULH1D16	6
	20	EP101ULH1B20▲	EP101ULH1C20▲	EP101ULH1D20	6
	25	EP101ULH1B25	EP101ULH1C25	EP101ULH1D25	6
	30	EP101ULH1B30▲	EP101ULH1C30	EP101ULH1D30	6
	32	EP101ULH1B32	EP101ULH1C32	EP101ULH1D32▲	6
	35	EP101ULH1B35▲	EP101ULH1C35▲	EP101ULH1D35▲	6
	40	EP101ULH1B40▲	EP101ULH1C40▲	EP101ULH1D40▲	6
	50	EP101ULH1B50▲	EP101ULH1C50▲	EP101ULH1D50▲	6
	60	EP101ULH1B60▲	EP101ULH1C60▲	EP101ULH1D60▲	6
	63	EP101ULH1B63▲	EP101ULH1C63▲	EP101ULH1D63▲	6
2P	0.5	-	EP102ULH2C0.5	EP102ULH2D0.5	3
	1	-	EP102ULH2C01	EP102ULH2D01▲	3
	2	-	EP102ULH2C02	EP102ULH2D02▲	3
	3	-	EP102ULH2C03▲	EP102ULH2D03	3
	4	-	EP102ULH2C04	EP102ULH2D04▲	3
	5	EP102ULH2B05	EP102ULH2C05	EP102ULH2D05	3
	6	EP102ULH2B06	EP102ULH2C06	EP102ULH2D06	3
	8	EP102ULH2B08▲	EP102ULH2C08	EP102ULH2D08	3
	10	EP102ULH2B10	EP102ULH2C10	EP102ULH2D10	3
	13	EP102ULH2B13	EP102ULH2C13	EP102ULH2D13	3
	15	EP102ULH2B15	EP102ULH2C15	EP102ULH2D15	3
	16	EP102ULH2B16▲	EP102ULH2C16	EP102ULH2D16	3
	20	EP102ULH2B20	EP102ULH2C20▲	EP102ULH2D20	3
	25	EP102ULH2B25	EP102ULH2C25▲	EP102ULH2D25	3
	30	EP102ULH2B30	EP102ULH2C30▲	EP102ULH2D30▲	3
	32	EP102ULH2B32	EP102ULH2C32▲	EP102ULH2D32▲	3
	35	EP102ULH2B35▲	EP102ULH2C35▲	EP102ULH2D35▲	3
	40	EP102ULH2B40▲	EP102ULH2C40▲	EP102ULH2D40▲	3
	50	EP102ULH2B50▲	EP102ULH2C50▲	EP102ULH2D50▲	3
	60	EP102ULH2B60▲	EP102ULH2C60▲	EP102ULH2D60▲	3
	63	EP102ULH2B63▲	EP102ULH2C63▲	EP102ULH2D63▲	3
3P	0.5	-	EP103ULH2C0.5	EP103ULH2D0.5	2
	1	-	EP103ULH2C01	EP103ULH2D01	2
	2	-	EP103ULH2C02	EP103ULH2D02	2
	3	-	EP103ULH2C03	EP103ULH2D03	2
	4	-	EP103ULH2C04▲	EP103ULH2D04	2
	5	EP103ULH2B05	EP103ULH2C05	EP103ULH2D05	2
	6	EP103ULH2B06	EP103ULH2C06▲	EP103ULH2D06	2
	8	EP103ULH2B08▲	EP103ULH2C08	EP103ULH2D08	2
	10	EP103ULH2B10	EP103ULH2C10	EP103ULH2D10	2
	13	EP103ULH2B13	EP103ULH2C13	EP103ULH2D13	2
	15	EP103ULH2B15	EP103ULH2C15	EP103ULH2D15	2
	16	EP103ULH2B16	EP103ULH2C16	EP103ULH2D16	2
	20	EP103ULH2B20	EP103ULH2C20	EP103ULH2D20	2
	25	EP103ULH2B25	EP103ULH2C25▲	EP103ULH2D25	2
	30	EP103ULH2B30	EP103ULH2C30	EP103ULH2D30▲	2
	32	EP103ULH2B32▲	EP103ULH2C32▲	EP103ULH2D32	2
	35	EP103ULH2B35▲	EP103ULH2C35▲	EP103ULH2D35▲	2
	40	EP103ULH2B40▲	EP103ULH2C40▲	EP103ULH2D40▲	2
	50	EP103ULH2B50▲	EP103ULH2C50▲	EP103ULH2D50▲	2
	60	EP103ULH2B60▲	EP103ULH2C60▲	EP103ULH2D60▲	2
	63	EP103ULH2B63▲	EP103ULH2C63▲	EP103ULH2D63▲	2

▲ Stocked in Mt. Juliet Distribution Center. Subject to change.

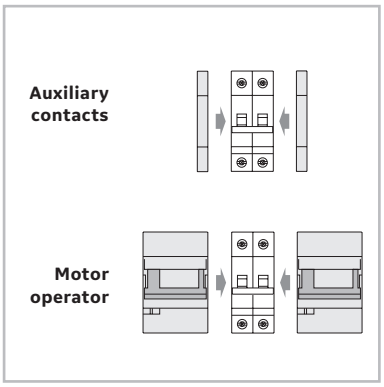
Application

Standards

UL1077
IEC 898-1
IEC 947-2

Approvals / Marking

Add-on devices



EP100 UL (Supplementary protection)

Recognized UL1077 **10kA**
CSA c22.2 No. 23
EN/IEC 60898-1 10000 / 3
EN/IEC 60947-2 **15kA**

277/480Vac

UL1077 performances

UL FILE		E151139
Ampere rating (A) 0.5-63		0.5-63A
Reference temperature	°F/°C	77/25
Terminal capacity flexible/rigid cable		14-2 AWG
Max. Torque N.m/lbs.in		4.5/39.8

Rated voltage (V)

Poles	V AC	V DC
1	277	50
2,3,4	480	110

AC Interrupting ratings

Poles	V	kA
1,2	277	10
3,4	277/480	10
1	120	10
2,3	240	10

DC Interrupting ratings

Poles	V DC	kA
1	50	10
2	110	10

IEC performances

Thermal setting		0.5-63A
Rated voltage AC	(V)	240/415V
Weight/pole	oz.(g)	4.41(125)
Terminal capacity flexible/rigid cable	(mm^2)	0.75/1 - 25/35

Short-circuit capacity according to IEC 60898-1

Poles	V AC	Icn (kA)
1	230/400	10
2,3,4	400	10

Short-circuit capacity according to IEC 60497-2

Poles	V AC	Icu (kA)
1	127	30
	240	15
	415	4
2	127	40
2,3,4	240	30
	415	15
	440	10

DC short-circuit capacity according to IEC 60497-2

Poles	V	Icu (kA)
1	60	25
2	125	30

General performance

Minimum operating voltage		12
Tripping characteristics		B-C-D
Rated frequency	(Hz)	50/60
Energy limiting class		3
Mechanical/electrical endurance		20000/10000
Humidity acc. to IEC 60068-2-28/2-30		95%RH at 131°F/55°C
Poles		1, 2, 3, 4

Instantaneous tripping ranges acc. to IEC 60898-1
B characteristic 3 to 5 times Ampere rating
C characteristic 5 to 10 times Ampere rating
D characteristic 10 to 20 times Ampere rating

ElfaPlus with UL approvals

UL1077 - Series EP100 UL - 10kA - characteristics B-C-D

		B curve	C curve	D curve	
	(A)	Cat. No.	Cat. No.	Cat. No.	Pack.
1P	0.5	-	EP101ULC0.5▲	EP101ULD0.5▲	12
	1	-	EP101ULC01▲	EP101ULD01▲	12
	2	-	EP101ULC02▲	EP101ULD02	12
	3	-	EP101ULC03▲	EP101ULD03▲	12
	4	-	EP101ULC04▲	EP101ULD04	12
	5	EP101ULB05▲	EP101ULC05▲	EP101ULD05▲	12
	6	EP101ULB06	EP101ULC06▲	EP101ULD06	12
	8	-	-	-	-
	10	EP101ULB10▲	EP101ULC10▲	EP101ULD10▲	12
	13	EP101ULB13	EP101ULC13	EP101ULD13	12
	15	EP101ULB15	EP101ULC15▲	EP101ULD15▲	12
	16	EP101ULB16▲	EP101ULC16▲	EP101ULD16	12
	20	EP101ULB20▲	EP101ULC20▲	EP101ULD20▲	12
	25	EP101ULB25	EP101ULC25▲	EP101ULD25▲	12
	30	EP101ULB30	EP101ULC30	EP101ULD30	12
	32	EP101ULB32	EP101ULC32	EP101ULD32	12
	40	EP101ULB40	EP101ULC40▲	EP101ULD40	12
	50	EP101ULB50	EP101ULC50▲	EP101ULD50	12
	60	EP101ULB60	EP101ULC60	EP101ULD60	12
	63	EP101ULB63	EP101ULC63	EP101ULD63	12
2P	0.5	-	EP102ULC0.5	EP102ULD0.5	6
	1	-	EP102ULC01	EP102ULD01▲	6
	2	-	EP102ULC02▲	EP102ULD02▲	6
	3	-	EP102ULC03	EP102ULD03	6
	4	-	EP102ULC04▲	EP102ULD04▲	6
	5	EP102ULB05	EP102ULC05▲	EP102ULD05▲	6
	6	EP102ULB06	EP102ULC06▲	EP102ULD06	6
	8	-	-	-	-
	10	EP102ULB10	EP102ULC10▲	EP102ULD10▲	6
	13	EP102ULB13	EP102ULC13	EP102ULD13	6
	15	EP102ULB15	EP102ULC15▲	EP102ULD15▲	6
	16	EP102ULB16	EP102ULC16▲	EP102ULD16▲	6
	20	EP102ULB20	EP102ULC20▲	EP102ULD20	6
	25	EP102ULB25	EP102ULC25▲	EP102ULD25	6
	30	EP102ULB30	EP102ULC30▲	EP102ULD30	6
	32	EP102ULB32	EP102ULC32	EP102ULD32	6
	40	EP102ULB40	EP102ULC40▲	EP102ULD40	6
	50	EP102ULB50	EP102ULC50	EP102ULD50	6
	60	EP102ULB60	EP102ULC60	EP102ULD60	6
	63	EP102ULB63	EP102ULC63	EP102ULD63	6
3P	0.5	-	EP103ULC0.5	EP103ULD0.5	4
	1	-	EP103ULC01	EP103ULD01	4
	2	-	EP103ULC02	EP103ULD02	4
	3	-	EP103ULC03	EP103ULD03	4
	4	-	EP103ULC04	EP103ULD04	4
	5	EP103ULB05	EP103ULC05	EP103ULD05	4
	6	EP103ULB06	EP103ULC06▲	EP103ULD06▲	4
	8	-	-	-	-
	10	EP103ULB10	EP103ULC10▲	EP103ULD10▲	4
	13	EP103ULB13	EP103ULC13	EP103ULD13	4
	15	EP103ULB15	EP103ULC15▲	EP103ULD15▲	4
	16	EP103ULB16	EP103ULC16▲	EP103ULD16	4
	20	EP103ULB20▲	EP103ULC20▲	EP103ULD20	4
	25	EP103ULB25	EP103ULC25▲	EP103ULD25	4
	30	EP103ULB30▲	EP103ULC30	EP103ULD30	4
	32	EP103ULB32	EP103ULC32	EP103ULD32▲	4
	40	EP103ULB40	EP103ULC40	EP103ULD40	4
	50	EP103ULB50	EP103ULC50	EP103ULD50	4
	60	EP103ULB60	EP103ULC60	EP103ULD60	4
	63	EP103ULB63	EP103ULC63	EP103ULD63	4
4P	0.5	-	EP104ULC0.5	EP104ULD0.5	3
	1	-	EP104ULC01	EP104ULD01	3
	2	-	EP104ULC02	EP104ULD02	3
	3	-	EP104ULC03	EP104ULD03	3
	4	-	EP104ULC04	EP104ULD04	3
	5	EP104ULB05	EP104ULC05	EP104ULD05	3
	6	EP104ULB06	EP104ULC06	EP104ULD06	3
	8	-	-	-	-
	10	EP104ULB10	EP104ULC10	EP104ULD10	3
	13	EP104ULB13	EP104ULC13	EP104ULD13	3
	15	EP104ULB15	EP104ULC15	EP104ULD15	3
	16	EP104ULB16	EP104ULC16	EP104ULD16	3
	20	EP104ULB20	EP104ULC20	EP104ULD20	3
	25	EP104ULB25	EP104ULC25	EP104ULD25	3
	30	EP104ULB30	EP104ULC30	EP104ULD30	3
	32	EP104ULB32	EP104ULC32	EP104ULD32	3
	40	EP104ULB40	EP104ULC40	EP104ULD40	3
	50	EP104ULB50	EP104ULC50	EP104ULD50	3
	60	EP104ULB60	EP104ULC60	EP104ULD60	3
	63	EP104ULB63	EP104ULC63	EP104ULD63	3

Dimensions see page A.8

▲ Stocked in Mt. Juliet Distribution Center. Subject to change.

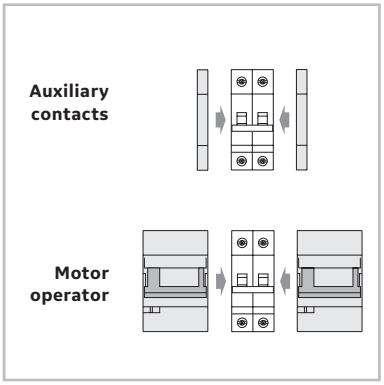
Applications

Standards

UL1077
IEC 898-1
IEC 947-2

Approvals / Marking

Add-on devices



EP60 UL (Supplementary protection)

Recognized UL1077 **6kA**
CSA c22.2 No.235
EN/IEC 60898 **6000 / 3**
EN/IEC 60947-2 **10kA**
277/480Vac

UL1077 performances

UL FILE		E151139
Ampere rating (A) 0.5-63		0.5-63A
Reference temperature	F/°C	77/25
Terminal capacity flexible/rigid cable		14-2 AWG
Max. Torque N.m/lbs.in		4.5/39.8

Rated voltage (V)

Poles	V AC	V DC
1	277	50
2,3,4	480	110

AC Interrupting ratings

Poles	V	kA
1,2	277	6
3,4	277/480	6
1	120	6
2,3	240	6

DC Interrupting ratings

Poles	V DC	kA
1	50	6
2	110	6

IEC performances

Thermal setting		0.5-63A
Rated voltage AC	(V)	240/415V
Weight/pole	oz.(g)	4.4(125)
Terminal capacity flexible/rigid cable	(mm^2)	0.75/1 - 25/35

Short-circuit capacity according to IEC 60898-1

Poles	V AC	Icn (kA)
1	230/400	6
2,3,4	400	6

Short-circuit capacity according to IEC 60497-2

Poles	V AC	Icu (kA)
1	127	20
	240	10
	415	3
2	127	30
2,3,4	240	20
	415	10
	440	6

DC short-circuit capacity according to IEC 60497-2

Poles	V	Icu (kA)
1	60	20
2	125	25

General performance

Minimum operating voltage Ubmin		12
Tripping characteristics		B-C-D
Rated frequency	(Hz)	50/60
Energy limiting class		3
Mechanical/electrical endurance		20000/10000
Humidity acc. to IEC 60068-2-28/2-30		95%RH at 131°F/55°C
Poles		1, 2, 3, 4

Instantaneous tripping ranges acc. to IEC 60898-1
B characteristic 3 to 5 times Ampere rating
C characteristic 5 to 10 times Ampere rating
D characteristic 10 to 20 times Ampere rating

UL1077-Series EP60 UL - 6kA - characteristics B-C-D

		B curve	C curve	D curve	
	(A)	Cat. No.	Cat. No.	Cat. No.	Pack.
1P	0.5	-	EP61ULC0.5	EP61ULD0.5	12
	1	-	EP61ULC01▲	EP61ULD01	12
	2	-	EP61ULC02▲	EP61ULD02▲	12
	3	-	EP61ULC03▲	EP61ULD03▲	12
	4	-	EP61ULC04▲	EP61ULD04▲	12
	5	EP61ULB05▲	EP61ULC05▲	EP61ULD05	12
	6	EP61ULB06▲	EP61ULC06▲	EP61ULD06▲	12
	8	-	-	-	-
	10	EP61ULB10▲	EP61ULC10▲	EP61ULD10▲	12
	13	EP61ULB13	EP61ULC13	EP61ULD13	12
	15	EP61ULB15▲	EP61ULC15	EP61ULD15▲	12
	16	EP61ULB16	EP61ULC16	EP61ULD16	12
	20	EP61ULB20▲	EP61ULC20▲	EP61ULD20	12
	25	EP61ULB25	EP61ULC25▲	EP61ULD25	12
	30	EP61ULB30	EP61ULC30	EP61ULD30	12
	32	EP61ULB32	EP61ULC32	EP61ULD32	12
	40	EP61ULB40	EP61ULC40	EP61ULD40	12
	50	EP61ULB50	EP61ULC50	EP61ULD50	12
	60	EP61ULB60	EP61ULC60	EP61ULD60	12
	63	EP61ULB63▲	EP61ULC63	EP61ULD63	12
2P	0.5	-	EP62ULC0.5	EP62ULD0.5	6
	1	-	EP62ULC01▲	EP62ULD01	6
	2	-	EP62ULC02▲	EP62ULD02▲	6
	3	-	EP62ULC03▲	EP62ULD03▲	6
	4	-	EP62ULC04	EP62ULD04▲	6
	5	EP62ULB05	EP62ULC05	EP62ULD05	6
	6	EP62ULB06	EP62ULC06	EP62ULD06▲	6
	8	-	-	-	-
	10	EP62ULB10	EP62ULC10	EP62ULD10▲	6
	13	EP62ULB13	EP62ULC13	EP62ULD13	6
	15	EP62ULB15	EP62ULC15▲	EP62ULD15	6
	16	EP62ULB16	EP62ULC16▲	EP62ULD16▲	6
	20	EP62ULB20	EP62ULC20▲	EP62ULD20▲	6
	25	EP62ULB25	EP62ULC25	EP62ULD25	6
	30	EP62ULB30	EP62ULC30	EP62ULD30	6
	32	EP62ULB32	EP62ULC32	EP62ULD32	6
	40	EP62ULB40	EP62ULC40	EP62ULD40	6
	50	EP62ULB50	EP62ULC50	EP62ULD50	6
	60	EP62ULB60	EP62ULC60	EP62ULD60	6
	63	EP62ULB63	EP62ULC63	EP62ULD63	6
3P	0.5	-	EP63ULC0.5	EP63ULD0.5	4
	1	-	EP63ULC01	EP63ULD01	4
	2	-	EP63ULC02	EP63ULD02▲	4
	3	-	EP63ULC03	EP63ULD03	4
	4	-	EP63ULC04	EP63ULD04	4
	5	EP63ULB05	EP63ULC05	EP63ULD05	4
	6	EP63ULB06▲	EP63ULC06	EP63ULD06	4
	8	-	-	-	-
	10	EP63ULB10	EP63ULC10▲	EP63ULD10▲	4
	13	EP63ULB13	EP63ULC13	EP63ULD13	4
	15	EP63ULB15▲	EP63ULC15▲	EP63ULD15	4
	16	EP63ULB16	EP63ULC16	EP63ULD16	4
	20	EP63ULB20	EP63ULC20▲	EP63ULD20▲	4
	25	EP63ULB25	EP63ULC25	EP63ULD25	4
	30	EP63ULB30	EP63ULC30▲	EP63ULD30▲	4
	32	EP63ULB32▲	EP63ULC32	EP63ULD32	4
	40	EP63ULB40	EP63ULC40	EP63ULD40▲	4
	50	EP63ULB50	EP63ULC50	EP63ULD50▲	4
	60	EP63ULB60	EP63ULC60	EP63ULD60	4
	63	EP63ULB63	EP63ULC63▲	EP63ULD63▲	4
4P	0.5	-	EP64ULC0.5	EP64ULD0.5	3
	1	-	EP64ULC01	EP64ULD01	3
	2	-	EP64ULC02	EP64ULD02	3
	3	-	EP64ULC03	EP64ULD03	3
	4	-	EP64ULC04	EP64ULD04	3
	5	EP64ULB05	EP64ULC05	EP64ULD05	3
	6	EP64ULB06	EP64ULC06	EP64ULD06	3
	8	-	-	-	-
	10	EP64ULB10	EP64ULC10	EP64ULD10	3
	13	EP64ULB13	EP64ULC13	EP64ULD13	3
	15	EP64ULB15	EP64ULC15	EP64ULD15	3
	16	EP64ULB16	EP64ULC16	EP64ULD16	3
	20	EP64ULB20	EP64ULC20	EP64ULD20	3
	25	EP64ULB25	EP64ULC25	EP64ULD25	3
	30	EP64ULB30	EP64ULC30	EP64ULD30	3
	32	EP64ULB32	EP64ULC32	EP64ULD32	3
	40	EP64ULB40	EP64ULC40	EP64ULD40	3
	50	EP64ULB50	EP64ULC50	EP64ULD50	3
	60	EP64ULB60	EP64ULC60	EP64ULD60	3
	63	EP64ULB63	EP64ULC63	EP64ULD63	3

Dimensions see page A.8

▲ Stocked in Mt. Juliet Distribution Center. Subject to change.

ElfaPlus with UL approvals

People protection - DIN-rail ground fault protection devices

Technical data: DIN-rail ground fault protection devices - RCDs and RCBOs

Series			RCCB FPAUL	RCBO DPA100
Standard UL			UL1053	UL1053
Certifications UL1053 file			E248309	E248309
Rated voltage 2 poles & 4 poles AC			240 V	277&240 (1P+N)
Rated current			<16, <25, <40, <63	10, 13, 16, 20, 25, 32
Rated residual current			10, 30, 100, 300, 500	10, 30
Frequency			50/60Hz	50/60Hz
Calibration temperature		°F/°C	86°F/30°C	86°F/30°C
Power supply			Top/Bottom	Top/Bottom
Fault current withstand			-	5kA (277V), 10kA (240V)
Standard IEC			IEC 61008-1	IEC 61009-1
Rated voltage	2P		240	240 (1P+N)
	4P		415	
Frequency			50/60Hz	50/60Hz
Power supply			Top/Bottom	Top/Bottom
Energy limiting class			-	3
Magnetic tripping characteristics			-	B,C
Residual tripping characteristic			A	A
Tripping time at IΔ n Instantaneous		ms	<40	<40
Number of poles versus modules			1	1
Rated making and breaking capacity (Im)		A	500 (or 10 x In)	-
Residual making and breaking capacity (IΔ m)		A	500 (or 10 x In)	6000
Conditional short-circuit capacity (Inc)		A	10000 fuse 80A gIgG	-
Conditional residual short-circuit capacity (IΔ c)		A	10000	-
Short-circuit capacity (Icn)		A	-	10000
Grid distance (safety distance between two devices)		in./mm	1.38/35	1.38/35
Isolator application			yes	yes
Insulation degree	Insulation voltage		500	500
	Shock voltage (1.2/50ms)		8	6
	Insulation resistance		1000	1000
	Dielectric strength		2500	2500
Shock resistance (in x, y, z direction) (IEC 60077/16.3)			40g, 18 shocks 5ms	40g, 18 shocks 5ms
Vibration resistance (in x, y, z direction; IEC 60068-2-6)			1.5g, 30 min, 0...80Hz	1.5g, 30 min, 0...80Hz
Number of Operations	electrical at nom. voltage & amperage		10000	10000
	mechanical at nom. voltage & amperage		20000	20000
Protection degree (outside/inside electrical enclosure)			IP20/IP40	IP20/IP40
Self extinguish degree (according to UL94)			V2	V2
Humidity (according to IEC 60068-2, DIN 40046)		°F/°C	131°F/+55°C/95%	131°F/+55°C/95%
Pollution degree (acc. IEC 60947-1)			3	3
Operating temperature			-13°F(-25°C)... 140°F (+60°C)	-13°F(-25°C)... 140°F (+60°C)
Storage temperature			-13°F(-25°C)... 158°F(+70°C)	-13°F(-25°C)... 158°F(+70°C)
Terminals capacity	Rigid cable min/max (top)	AWG(mm²)	14/1(1.5/50)	18/4(1/25)
	Flexible cable min(1)/max (top)	AWG(mm²)	14/2(1.5/35)	18/6(1/16)
	Rigid cable min/max (bottom)	AWG(mm²)	14/1(1.5/50)	18/4(1/25)
	Flexible cable min(1)/max (bottom)	AWG(mm²)	14/2(1.5/35)	18/6(1/16)
Maximum torque	Top/Bottom	Nm(lb.in)	5(44.25)	3(26.55)
Add-on devices	Auxiliary contacts		yes	yes
	(side add-on) Tele L		yes	yes
	(side add-on) Tele U		yes	yes
Tele M			yes	yes
Dimensions, weights, packaging				
# Poles			2-4	1P+N
(H x D x W) 3.4(86) x 2.7(68) x W		in.(mm)	1.42(36)/ 2.84(72)	1.42(36)
Weight/unit		oz.(grams)	2P= 9(250)/4P= 13(368)	9(250)
Package/unit			2P=1/6 / 4P=1/3	1/6
Approvals			UL	UL & CEBEC
CE-marking			yes	yes
Page			B.4	B.6

(1) Flexible cable 18...14 AWG (0.75/1/1.5mm²) with cable lug

DIN-rail ground fault protection devices Residual Current Circuit Breakers

Series FPAUL

Recognized UL1053
IEC 61008
Type A

240Vac

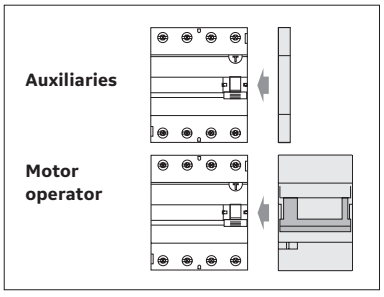
Applications

Standards

UL1053
EN/IEC 61008

Approvals / Marking

Add-on devices



UL1053 performances

UL FILE	E248309
Maximum voltage AC (V)	240
Fault current withstand (kA)	10
Thermal setting In	16, 25, 40, 63

Ground-fault sensing and relaying equipment: *Self Powered* sensing equipment

The GFPD provides ground fault protection for electrical circuits. It will automatically open the circuit in the case of a ground fault between conductors and ground greater than 10, 30, 100, 300, 500 mA, depending on the model. The GFPD is available in 2 Poles and 4 Poles (3 or 4-wire versions.) The GFPD only detects ground fault current. There is no inside thermal and magnetic protection. Therefore, the circuit must be protected upstream by an approved device such us EP100UL, EP100ULH or a fuse.

IEC/EN performances

Thermal setting	(A)	16, 25, 40, 63
Residual current IΔ n	(mA)	10, 30, 100, 300, 500
Rated maximum voltage AC	(V)	2P: 240 4P: 240/415
Minimum operating voltage U_{Bmin}	(V)	2P: 117(1) 4P: 190(1)
Mechanical/electrical endurance		20000/10000
Humidity acc. to IEC 60068-2-28/2-30 and DIN 40046		95%RH at 131°F/55°C
Terminal capacity flexible/rigid cable	2-1 AWG	(35-50 mm²)
Poles		2, 4
Nuisance tripping resistance		A: 250A 8/20µs;
Ambient temperature	°F(°C)	Type A: 13° up to 104° (-25° up to 40°)
Weight	oz.(g)	2P: 7.76(220) 4P: 13.58(385)

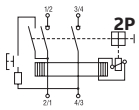
(1) For 30mA 2P and 4P U_b = 175V

Short-circuit capacity

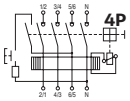
According to IEC 61008	
Making and breaking capacity	500A
Residual making and breaking capacity	≥ 500A from 16 up to 40A
Short-circuit capacity	10000A at 230/400V with fuse 80A gG

ElfaPlus with UL approvals

Series FPAUL - Type A

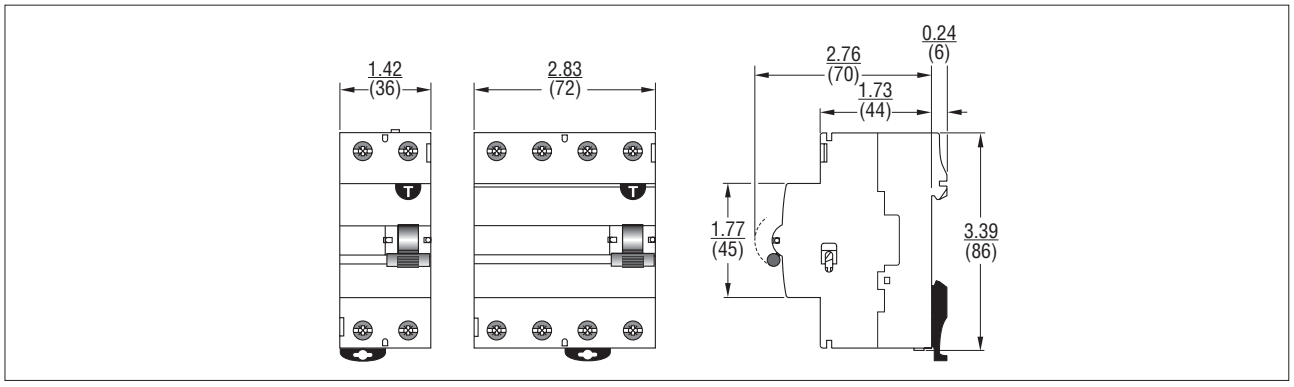


In (A)	10/30 mA Cat. No.	100 mA Cat. No.	300 mA Cat. No.	500 mA Cat. No.	Pack.
15	FPAUL216/010	-	-	-	-
25	FPAUL225/030	FPAUL225/100	FPAUL225/300	FPAUL225/500	1/6
40	FPAUL240/030	FPAUL240/100	FPAUL240/300	FPAUL240/500	1/6
63	FPAUL263/030	FPAUL263/100	FPAUL263/300	FPAUL263/500	1/6



In (A)	30 mA Cat. No.	100 mA Cat. No.	300 mA Cat. No.	500 mA Cat. No.	Pack.
25	FPAUL425/030	FPAUL425/100	FPAUL425/300	FPAUL425/500	1/3
40	FPAUL440/030	FPAUL440/100	FPAUL440/300	FPAUL440/500	1/3
60	FPAUL463/030	FPAUL463/100	FPAUL463/300	FPAUL463/500	1/3

Dimensional drawings in.(mm)



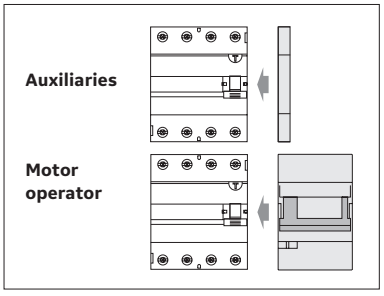
Applications

Standards

UL1053
EN/IEC 61009-1

Approvals / Marking

Add-on devices



DIN-rail ground fault protection devices Residual Current Circuit Breakers with overcurrent protection

Series DPA100

Recognized UL1053	**277Vac**	**5kA**
	240Vac	**10kA**
EN 61009-1	6000 / 3	
Type A		

UL performances

UL file	E248309
Rated/Maximum voltage AC (V)	240 or 277
Fault current withstand	5kA (277V), 10kA (240V)
Pick up current (UL 1053)	0.65x rated sensibility
Rated current	10, 13, 16, 20, 25, 32
Rated frequency	50/60Hz

Ground-fault sensing and relaying equipment: *Self Powered* sensing equipment

The RCBOs DP100 UL1053 approved in only two module widths offer complete protection against overload, short-circuit and ground fault. They are equipped with a single red/green two-color operating toggle.

IEC/EN performances

Thermal setting	(A)	10 to 32
Residual current	(mA)	10, 30, 100, 300
Tripping characteristic		B (3In-5In)-C (5In-10In)
Rated voltage AC	(V)	240
Minimum operating voltage	(V)	100(1)
Mechanical/electrical endurance		20000/10000
Humidity acc. to IEC 60068-2-28/2-30 and DIN 40046		95%RH at 131°F/55°C
Terminal capacity flex./rigid cable		
Top terminal		6-4 AWG (16-25 mm^2)
Bottom terminal:		4-2 AWG (25-35 mm^2)
Poles		1+N
Nuisance tripping resistance		250A 8/20µs 200A 0.5µs - 100kHz
Ambient temperature	°F(°C)	Type A: 13°F up to 104° (-25° up to 40°)
Weight	oz.(g)	9(250)

(1) For 30mA U_{bmin} = 175V

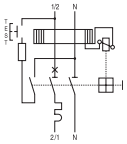
Short-circuit capacity

According to IEC 61009-1	
Residual making and breaking capacity	7500A
Short-circuit capacity	10000A at 230V
Energy limiting class	3
According to IEC 60947-2	
Short-circuit capacity	15000A at 230V

ElfaPlus with UL approvals

DPA100 - 10000/3 Type A ≂ - characteristic B

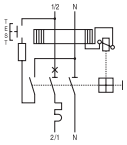
Neutral right
1P + N



(A)	10 mA Cat. No.	30 mA Cat. No.	Pack.
10	DPA100B10/010	DPA100B10/030	1/6
13	DPA100B13/010	DPA100B13/030	1/6
16	DPA100B16/010	DPA100B16/030	1/6
20	DPA100B20/010	DPA100B20/030	1/6
25	-	DPA100B25/030	1/6
32	-	DPA100B32/030	1/6

DPA100 - 10000/3 Type A ≂ - characteristic C

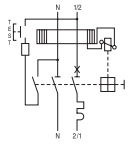
Neutral right
1P + N



(A)	10 mA Cat. No.	30 mA Cat. No.	Pack.
10	DPA100C10/010	DPA100C10/030	1/6
13	DPA100C13/010	DPA100C13/030	1/6
16	DPA100C16/010	DPA100C16/030	1/6
20	DPA100C20/010	DPA100C20/030	1/6
25	-	DPA100C25/030	1/6
32	-	DPA100C32/030	1/6

DPA100 - 10000/3 Type A ≂ - characteristic B

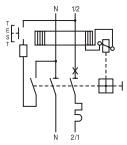
Neutral left
1P + N



(A)	10 mA Cat. No.	30 mA Cat. No.	Pack.
10	DPLA100B10/010	DPLA100B10/030	1/6
13	DPLA100B13/010	DPLA100B13/030	1/6
16	DPLA100B16/010	DPLA100B16/030	1/6
20	DPLA100B20/010	DPLA100B20/030	1/6
25	-	DPLA100B25/030	1/6
32	-	DPLA100B32/030	1/6

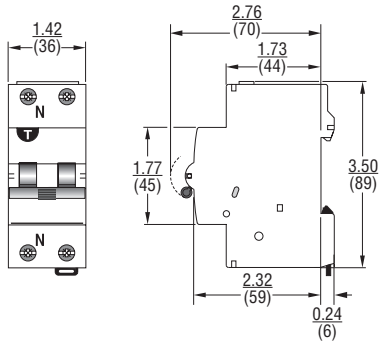
DPLA100 - 10000/3 Type A ≂ - characteristic C

Neutral left
1P + N



(A)	10 mA Cat. No.	30 mA Cat. No.	Pack.
10	DPLA100C10/010	DPLA100C10/030	1/6
13	DPLA100C13/010	DPLA100C13/030	1/6
16	DPLA100C16/010	DPLA100C16/030	1/6
20	-	DPLA100C20/030	1/6
25	-	DPLA100C25/030	1/6
32	-	DPLA100C32/030	1/6

Dimensional drawings in.(mm)

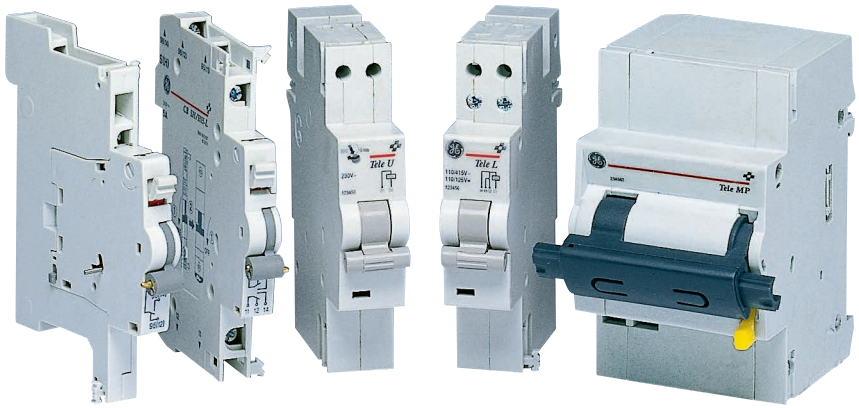


ElfaPlus with UL approvals

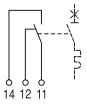
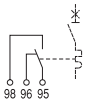
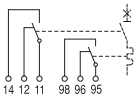
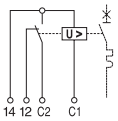
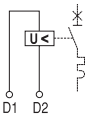
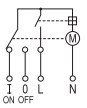
Auxiliaries, accessories and busbars - UL recognized, CA, CB, Tele L, Tele U

Add-on devices for MCBs and RCDs

Add-on devices for supplementary protection and ground fault protection devices



Common add-on devices suitable for all MCBs and RCDs

Function			Type
H		**Auxiliary contact H** For monitoring the status of the protection device (Open/Closed) independently, if it has been actuated manually or automatically.	CA
S		**Signal or auxiliary contact S/H** For signaling the automatic tripping of the protection devices: Overload or short-circuit for MCBs Earth leakage tripping for RCDs	CA
S/H+H		**Signal or auxiliary contact S/H + auxiliary contact H** Two change-over contacts that include both functions as described above (S/H+H)	CB
TL		**Shunt trip (distance tripping by emission)** For opening the device when it is fed locally or remotely	Tele L
TU		**Undervoltage release** For opening the device when the voltage goes lower than a certain value	Tele U
TM		**Motor operator**(1) Allows switching the device on/off from a distance	Tele MP

(1) Motor operator Tele MP according to EN/IEC 60947-2

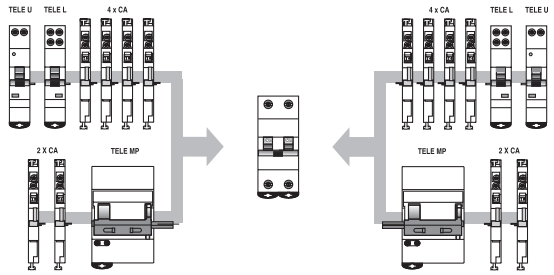
ElfaPlus with UL approvals

Coupling of add-on devices on MCBs, RCCBs, RCBOs and modular switches

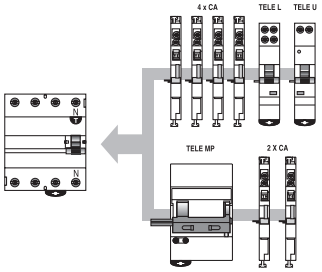
Cat. No.	Description	Function	EP60UL	EP100UL	FPAUL	DPA100
CAH	Auxiliary contact	H	L-R	L-R	R	R
CAS/H	Signal or auxiliary contact	S/H	L-R	L-R	R	R
CAS/H-G	Signal or auxiliary contact, golden contact	S/H	L-R	L-R	R	R
CBSH/HH-R	Signal or auxiliary + auxiliary contact	S/H+H	R	R	R	R
CBSH/HH-L	Signal or auxiliary + auxiliary contact	S/H+H	L	L	-	-
TeleL	Shunt trip	TL	L-R	L-R	L-R	L-R
TeleU	Undervoltage relay	Tele U	L-R	Tele U	Tele U	R
TeleMP	Motor operator	TM	L-R	L-R	L-R	L-R

L = Coupling on the left
R = Coupling on the right

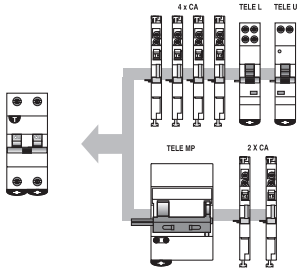
Miniature Circuit Breakers
Series EP UL



Residual Current Circuit Breakers (RCCB)
Series FPAUL

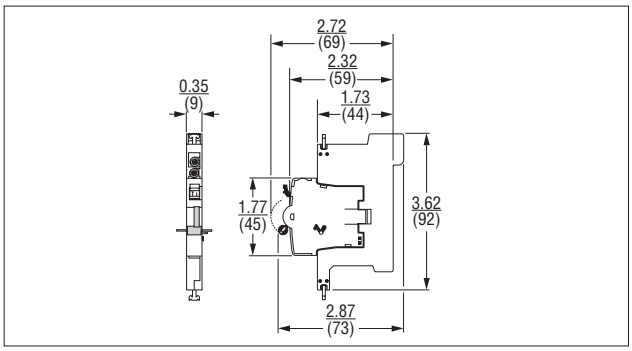


Residual Current Circuit Breakers (RCBO)
with overcurrent protection
Series DPA100

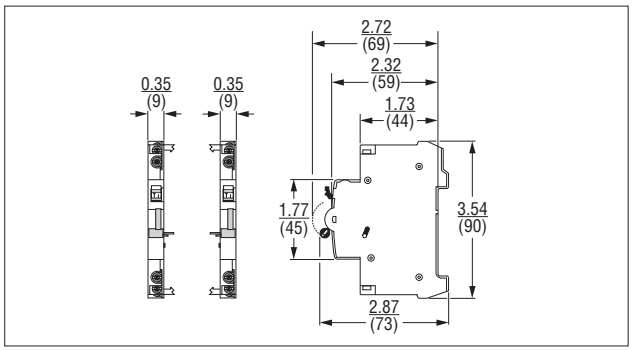


Dimensional drawings in.(mm)

Auxiliary - Series CA



Auxiliary - Series CB / CBT



Auxiliary switches

Series CA — EN/IEC 62019

- Common for following modular protection devices: UL1077, UL1053 devices up to 63A and max. 14 AWG, RCCBs up to 100A and mains disconnect switches type ASTER (ASTM).
- Can be coupled on both sides of UL1077 devices and on the right side of UL1053 devices.
- Version with golden contacts, available for low current as well as low voltage applications.
- Stack-on left and right up to 4 CA units.
- Permits the pass-through of busbars, pin & fork, top and bottom, just changing the position of the base of the auxiliaries.

Applications

Performance

UL file		E151139 (UL 1077)
Change-over contacts		1
AC rated voltage/rated current	(V/A)	240/5
DC rated voltage/rated current	(V/A)	220/0.4; 60/1; 24/4
Electrical endurance		10000
Terminal capacity flexible/ rigid cable		max. 14 AWG (2.5 mm²)
Weight	oz.(g)	2.47(70)

Approvals

Functions

The auxiliary contacts are units to be added on to protection devices. They allow information about the protection devices to be monitored from a distance.

Auxiliary contact CA H (function H)

Provides the status of the protection device, OPEN/CLOSED.

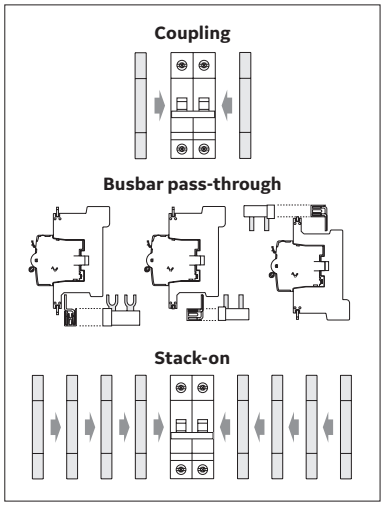
Signal or auxiliary contact CA S/H, CA S/H G (function S/H)

This auxiliary can act as an auxiliary contact (function H) or as a signal contact (function S).

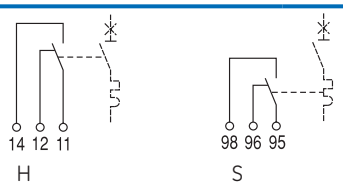
The user can change the function at the moment of installation.

Used as signal contact (function S) it provides the information about the automatic tripping of the protection devices: overload or short-circuit for MCBs, earth leakage tripping for RCDs.

- The device has a test button on the front to simulate the function (acting as a function H or S)
- Reset button for the contacts (function S)
- Tripping signal on the front (function S)



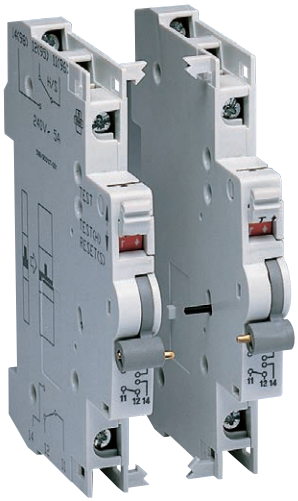
Series CA



1/2 mod.

Function	Cat. No	Pack.	
H	CAH▲	1	
S/H	CAS/H	1	
S/H	CAS/HG▲	1	golden contacts

▲ Stocked in Mt. Juliet Distribution Center. Subject to change.



Applications

Approvals

Auxiliary switches

Series CB — EN/IEC 62019

- Common for UL1077 and UL1053 modular devices up to 63A and max. 14 AWG.
- Can be coupled on both sides of UL1077 devices and on the right side of UL1053 devices.
- This device has 2 change-over contacts, the upper one with changeable function (S/H).
- Two versions: CB SH/HH-R to be coupled on the right side of the protection devices, CBSH/HH-L when assembled on the left side
- No stack-on possibilities (only 1 auxiliary)
- No busbar pass-through facilities

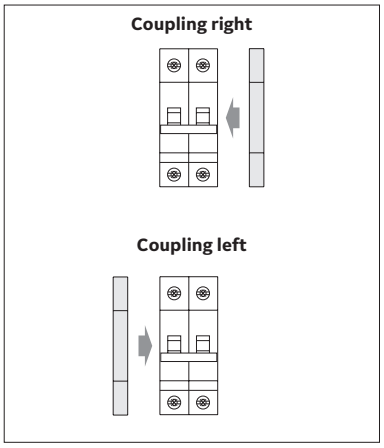
Performance

UL file		E151139 (UL 1077)
Change-over contacts		2
AC rated voltage/rated current	(V/A)	240/5
DC rated voltage/rated current	(V/A)	220/0.4; 60/1; 24/4
Electrical endurance		10000
Terminal capacity flexible/rigid cable	AWG(mm²)	18-14(2.5)
Weight	oz.(g)	2.82(80)

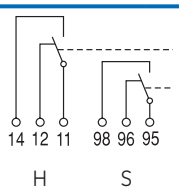
Functions

Bottom auxiliary contact (function H)
Provides the status of the protection device, OPEN/CLOSED.
Top signal or auxiliary contact (function S/H).
This auxiliary can act as an auxiliary contact (function H) or as a signal contact (function S)
The user can make the function change at the moment of installation.
Used as signal contact function (function S) it provides information about automatic tripping of the protection devices: overload or short-circuit for UL1077 devices, earth leakage tripping for UL1053 devices.

- The device has a test button on the front to simulate the function (acting as a function H or S)
- Reset button for the contacts (function S)
- Tripping signal on the front (function S)



Series CB



1/2 mod.

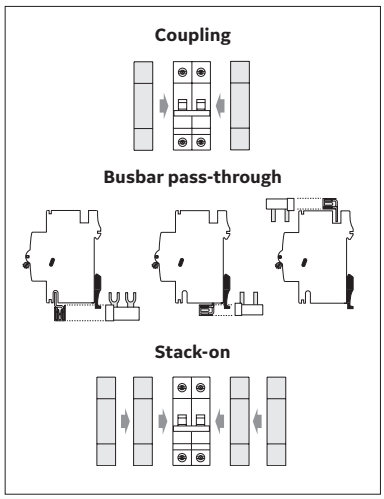
Function	Cat. No	Pack.
SH/HH	CBSH/HH-R(1)	1
SH/HH	CBSH/HH-L(2)	1

(1) R= coupling on the right
(2) L= coupling on the left

Applications

Approvals

EN/IEC 60947-2



Auxiliary switches

Shunt trip Tele L

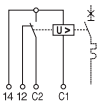
- Common device for all modular protection devices.
- Can be coupled on both sides of UL1077 devices and on the right side of UL1053 modular devices.
- Permits the pass-through of busbars, pin & fork, at top or bottom terminals.
- Stack-on left and right side up to 4 modules.

Performance

The Tele L allows remote switch off of any UL1077 or UL1053 modular device by means of push-buttons or any other automatic management processor.
A built-in contact in series with the coil prevents burn- out damage if the voltage remains.

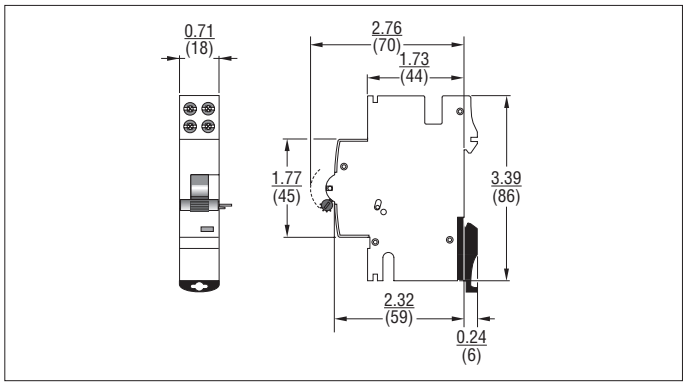
UL file		E151139 (UL 1077)
Rated voltage	(V)	110/415, 110/125 DC
	(V)	24/60, 24/48 DC
Tripping time	(ms)	<10
Electrical endurance		10000
Terminal capacity flexible/ rigid cable	AWG(mm²)	18-14(2.5)
Weight	oz.(g)	4.41(125)
Inrush current (Tele 2)	at 110V AC	0.4A
	at 230V AC	0.9A
	at 415V AC	1.5A

Tele L - Shunt trip

	Voltage	Cat. No.	Pack.
1P 1 mod.	AC 24-60V DC 24-48V	TELEL-1	1
	AC 110-415V DC 110-125V	TELEL-2▲	1

▲ Stocked in Mt. Juliet Distribution Center. Subject to change.

Dimensional drawings in.(mm)

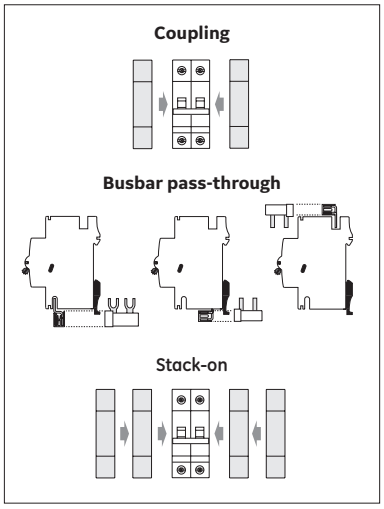


Auxiliary switches

Applications

Approvals

EN/IEC 60947-2 (1)



(1) Ask for availability. Under Type approval.

Undervoltage release Tele U

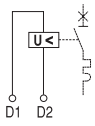
The Tele U releases the main UL1077 and UL1053 modular devices in case the power supply drops below 0.5x rated voltage. Time delay adjusting up to 300 ms.

Performance

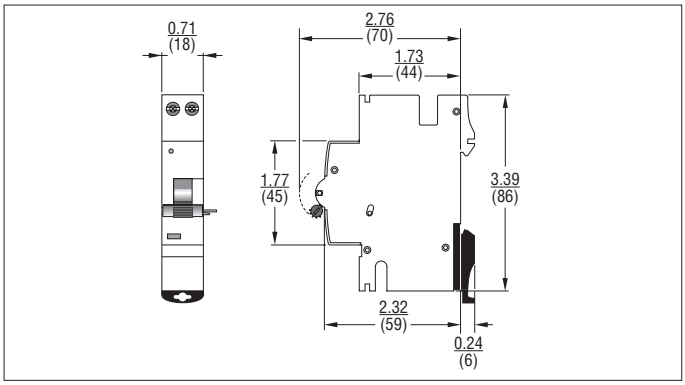
Rated voltage AC	(V)	240
Rated voltage DC/AC	(V)	12, 24, 48 DC/AC
Tripping voltage	(V)	≤0.5xUn±10%
Resetting voltage	(V)	>0.5xUn±10%
Tripping time	(ms)	Adjustable 0...300
Electrical endurance		2000
Terminal capacity flexible/rigid cable	AWG(mm²)	18-14(2.5)
Weight	oz.(g)	4.41(125)

Tele U - Undervoltage release

	Voltage	Cat. No.	Pack.
1P 1 mod.	AC 240V	TELEU-230	1
	AC/DC 12V	TELEU-12	1
	AC/DC 24V	TELEU-24	1
	AC/DC 48V	TELEU-48	1



Dimensional drawings in.(mm)

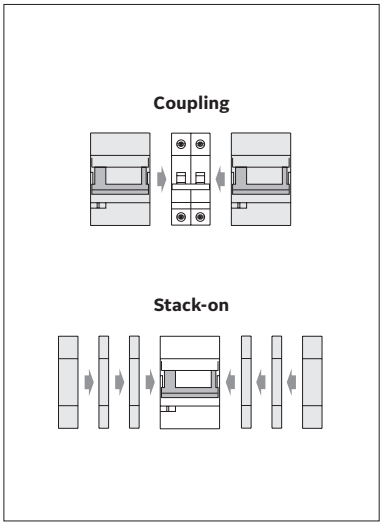


Motor operator

Applications

Approvals

EN/IEC 60947-2 CE



Tele MP

- Common device for all modular protection devices.
- Can be coupled on both sides of MCBs and modular switches, on the right hand side of RCCBs and RCBOs.
- Stack-on left and right sides up to 4 modules. One of them can be coupled between the main device and the motor operator.
- Can be locked in off position with a lock.
- Manual operating is possible.

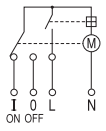
Performance

The Tele MP allows remote open or close of any MCB, RCCB, RCBO or modular switch by means of a push-button or any other automatic management processor (PLC).

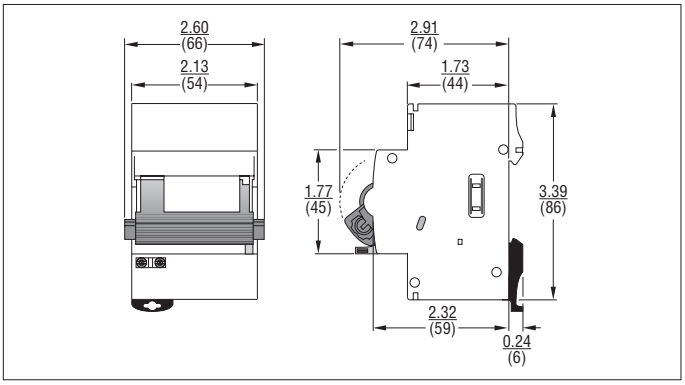
Rated voltage	(V)	240
Minimum voltage	(V)	200
Impulse to switch on	(ms)	50
Impulse to switch off	(ms)	50
Closing time	(s)	0.5
Opening time	(s)	0.2
Electrical endurance		10000
Terminal capacity flexible/rigid cable	AWG(mm²)	18-14(2.5)
Weight	oz.(g)	13.4(380)

Tele MP - Motor operator

	Voltage	Cat. No.	Pack.
1P 1 mod.	AC 230V	TELEMP	1



Dimensional drawings in.(mm)



ElfaPlus with UL approvals

Busbars for Circuit Breakers, supplementary protection and ground fault protection devices

Series		BS..PULL	BS..PULR
Standards		UL489	UL1077
Certifications		UL489; UL File Nr EXXXXXX(1)	UL1077; UL File Nr EXXXXXX(1)
Operational Voltage			
UL489	VAC	480Y/277 and 240	480Y/277 and 240
Short-circuit resistance with 100A fuse		25kA	25kA
Dielelectric strength acc. DIN 53481/1.2	KV/mm	36	36
Rated current at 104°F(40°C) ambient temperarature		110	110
Maximum operating voltage	VAC	500	500
Insulation coordination			
Degree of polution		2	2
Overvoltage category		II	II
Busbar cross-section	AWG(mm²) Cu	6(16)	6(16)
Infeed		Any	Any
Rail		Copper (oxygen free)	Copper (oxygen free)
Insulation strip		Plastic	Plastic
Heat Resistance		>205°F(96°C) self extinguishing V0	> 205°F(96°C) self extinguishing V0
Poles		1,2,3	1,2,3
Accessories			
Tooth cap		yes	yes
Pin connector		yes	yes

(1) Ask for availability. Under Type approval.

Performance

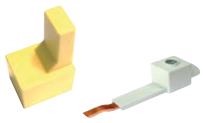
- Busbars for UL489 circuit breaker devices and for UL1077 and UL1053 modular devices
- 30% Installation time savings!
- Panel space savings.
- Available in 1, 2, 3 – phase busbars.
- Combining 6 or 12 module UL489 busbars it is possible to link from 12 to 60 poles.
- Yellow tooth-cap available for live free pins.
- Pin connectors adapted for UL489 and UL1077 busbars to feed the row.

ElfaPlus with UL approvals

Busbars according to UL489 for use with EP100ULH[1]

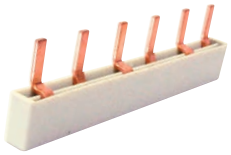
	Poles	Max. Voltage	Modules	PIN spacing[2]	Cat. No.	Pack
For 6 MCBs	1	600 Vac	6	1 module	BS1PULL600/06	1/100
For 12 MCBs	1	600 Vac	12	1 module	BS1PULL600/12	1/50
For 3 MCBs	2	600 Vac	6	1 module	BS2PULL600/06	1/100
For 6 MCBs	2	600 Vac	12	1 module	BS2PULL600/12	1/50
For 2 MCBs	3	600 Vac	6	3 module	BS3PULL600/06	1/100
For 4 MCBs	3	600 Vac	12	4 module	BS3PULL600/12	1/50

Busbars accessories according to UL489 for use with EP100ULH[1]



	Cat. No.	Pack
Tooth cap	IcapUL1	10/20
Pin connector	ASUL	1/30

Busbars to UL1077 for use with EP100UL, FP and DP RCCBs and RCBOs



	Poles	Voltage	Modules	PIN spacing[2]	Cat. No.	Pack
For 12 MCBs	1	480Y/277	12	1 module	BS1PULR277/12	1/50
For 6 MCBs	2	480Y/277	12	1 module	BS2PULR480/12	1/50
For 4 MCBs	3	480Y/277	12	1 module	BS3PULR480/12	1/50

(1) Fixed lengths, can't be cut
(2) 1 module width = 0.71in.(18mm)

Busbars accessories according to UL1077

	Cat. No.	Pack
Tooth cap	IcapUL2	5/20
Pin connector	ASUL2	1/30

Accessories for MCBs

	Cat. No.	Pack.
Walls for terminals	WUL	10

Padlocking bracket

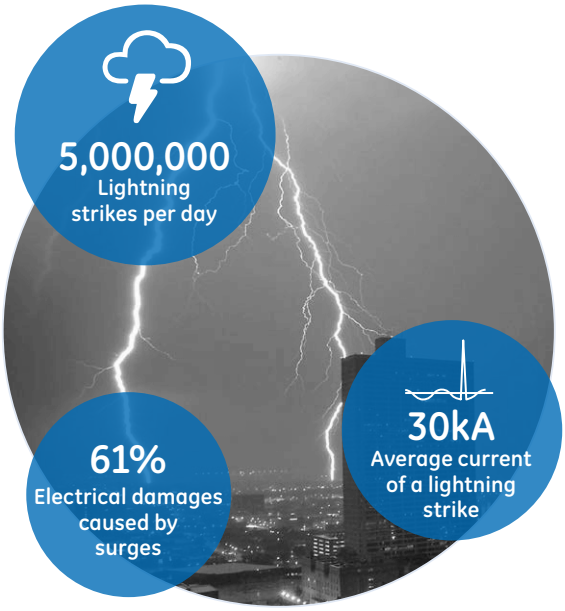
	Cat. No.	Pack.
Allows padlocking in ON and OFF position	KS	2

ElfaPlus with UL approvals

Surge protection devices DIN-rail for equipment protection

UL1449 3rd edition, DIN-rail SPDs for distribution panels

Introduction



Risk of electrical surges

Lightning and surge protection electrical and electronic equipment is indispensable in the daily activities of today's businesses and individuals.

Such devices are connected to the electricity grid, often exchanging data and signals through communication lines and are usually sensitive to disturbances.

These interconnecting networks provide a propagation path for overvoltages.

Protection against lightning and overvoltages not only ensures the safety of people, goods and equipment, but also ensures continuity of installation services and meets criteria of energy efficiency.

Overvoltage protection extends the life of the equipment by more than 20%, which significantly reduces the volume of electronic waste. It also reduces the power consumption of the installations, all of which translates into cost savings and environmental sustainability.

Transient voltage surges in LV power lines

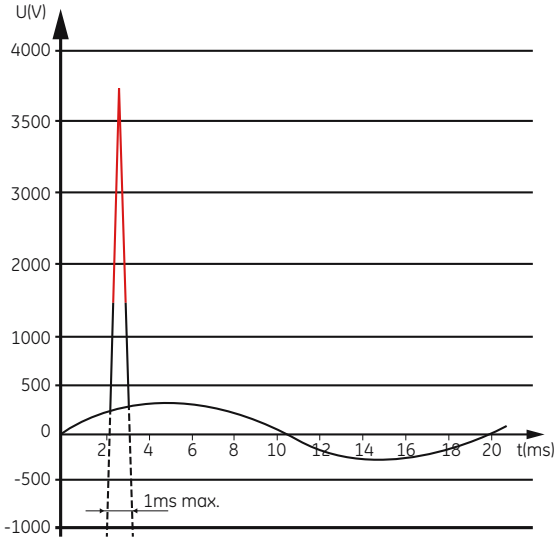
Transient overvoltages are voltage surges that can reach tens of kilovolts with a duration in the order of microseconds.

Despite their short duration, the high energy content can cause serious problems to equipment connected to the line, from premature aging to destruction, causing disruptions to service and financial loss.

This type of surge can have various different causes, including atmospheric lightning directly striking the external protection (lightning rods) on a building or transmission line, or the associated induction of electromagnetic fields on metallic conductors. Outdoor and longer lines are the most exposed to these fields, which often receive high levels of induction.

It is also common for non-weather phenomena such as transformer center switching or the disconnection of motors or other inductive loads to cause voltage spikes in adjacent lines.

The protector will discharge excess energy to earth, thus limiting the peak voltage to a value acceptable for the electrical equipment connected.



When the peak voltage reaches a value higher than the equipment can withstand, it causes its destruction.

Terminology of SPD electrical characteristics

Protection parameters according to UL1449 3rd edition

Imax

MAXIMUM DISCHARGE CAPACITY
Maximum peak current, per phase, in 8/20 µs wave that the protection device is able to withstand.

VPR

VOLTAGE PROTECTION RATING
This indicates the maximum residual voltage between the terminals of the protection device during application of an In peak current.

In

NOMINAL DISCHARGE CURRENT RATING
Peak current in 8/20 µs wave that the protection device can withstand on 15 occasions without reaching the end of its service life.

MCOV

MAXIMUM CONTINUOUS OPERATING VOLTAGE
This indicates the maximum effective or direct current voltage that can be permanently applied to the terminals of the protection device.

TYPE

Type 1

Permanently connected SPDs intended for installation between the secondary of the service transformer and the line side of the service equipment (main panel) overcurrent device, as well as the load side, including watt-hour meter socket enclosures and intended to be installed without an external overcurrent protective device.

Type 2

Permanently connected SPDs intended for installation on the load side of the service equipment (main panel) overcurrent device; including SPDs located at the branch panel.

Type 3

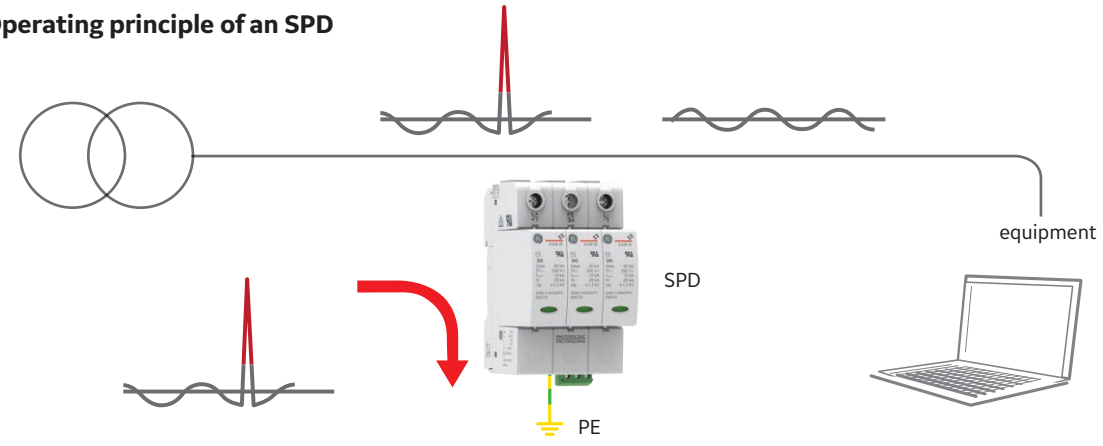
Point of utilization SPDs, installed at a minimum conductor length of 30 feet (10 meters) from the electrical service panel to the point of utilization.

For example cord connected, direct plug-in, receptacle type and SPDs installed at the utilization equipment being protected. The distance 30 feet (10 meters) is exclusive of conductors provided with or used to attach SPDs that the protection device is able to withstand.

The importance of the ground connection

A ground in proper conditions is therefore an aspect not to overlook when it comes to effective surge protection.

Operating principle of an SPD



Standards

UL1449 3rd edition

The objective of UL1449 has always been to increase safety in terms of surge protection. Thus, major changes have recently been made to the surge protection standard. The latest edition, known as UL1449 3rd edition, was published on September 29, 2006 and took effect September 2009, and is now also an ANSI standard. A revision was made on February 8, 2011.

To avoid confusion, the objective of this paper is to explain and summarize the major changes made to the standard.

The key updates are:

– Change in the standard's name
– The nominal discharge current

Approvals

c UL us

Change in the standard's name: from TVSS to SPDs

Prior to UL1449 3rd edition taking effect, the devices this standard covers were known as transient voltage surge suppressors standard covers were known as transient voltage surge suppressors (TVSS), operating on power circuits not exceeding 600V. With the inception of the 3rd edition, these devices are now known as surge protective devices (SPDs), and may operate on power circuits not exceeding 1000V. This new designation moves the UL standard closer to the International designation and to IEC standards. The new edition is now renamed UL standard for safety for surge protective devices, UL1449.

The nominal discharge current, known as rated current test is new to UL1449, coming from the IEC standard.

During the test, the SPD is subjected to 15 impulses at the selected nominal discharge current. In order to pass, the SPD cannot create a shock or fire hazard during the test, and nothing in the surge path can open during or after the test.

The nominal discharge current values, with a 8/20 µs wave shape, are selected by the manufacturer as follows:

Type 1: 10 or 20kA

Type 2: 3, 5, 10 or 20kA

Type 1, Type 2 and Type 4 SPDs (intended for type 1 or Type 2 applications) are subjected to this test.

Sources: Underwriters Laboratories Inc., standard for safety, surge protective devices

(UL1449 Third Edition, 2011)

Wiring diagrams according to ANSI C84.1

The majority of modern installations in both the US and Canada feature the following kind of power distribution system.

Single phase systems

Single phase
2 wires 120/240/277V

Split phase
3 wires 240/120V, 480/240V

Residential buildings

i.e. Single phase 240 (Ph-Ph)/120V (to GRND) Grounded midpoint

For example:
120V are used on the wall receptacle and 240V for ovens, ranges, air conditioning and laundry dryers.

Three phase / Three wire systems

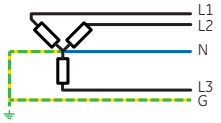
Delta 240/480/600V

Industrial and commercial buildings

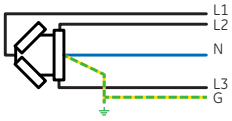
* Y describes the solidly grounded circuit. The value "Y" indicates the voltage between phases.
The value behind the slash indicates the voltage between phase and the grounding or neutral conductor.

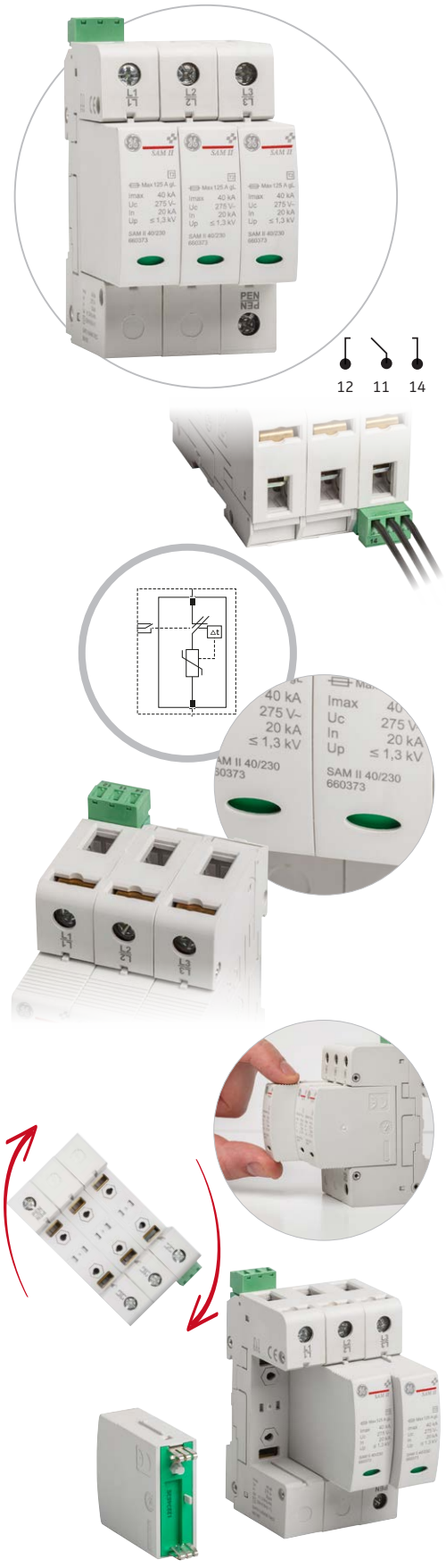
Three phase / Four wire systems

Grounded Wye
208Y/120V, 480Y/277V, 600Y/347V



High-Leg Delta
240/120V HLD





Features & benefits

The SAP DIN-rail SPDs utilize fast acting metal oxide varistor (MOV) technology to limit overvoltage to values compatible with the sensitive equipment connected to the network.

End of life indicator

This feature is standard on all SAP range pluggable DIN-rail surge protectors.

Each cartridge is equipped with a mechanical indicator which is green when the SPD is operational and protecting the system, and turns red when it has reached end of life. When this occurs, the cartridge must be replaced to guarantee protection.

Remote indication

Dry contacts, optional in all ranges, for remote indication of protector end of life.

New, optimized disconnection system

GE has developed an optimized disconnection system for end of life.

Complies with the disconnection tests of the standards for protectors for photovoltaic applications.

Protector lifetime

Status indication
Clear display of protection
End of life

Biconnect connection

Two types of terminals: for rigid or flexible cable and for fork type comb busbar.

Cartridge security system

Vibration-proof insertion “click” effect.

Reversible installation

Reversible chassis to allow cable entry from above or below.

Mechanical cartridge coding

Safety system to avoid possible cartridge replacement errors.

ElfaPlus with UL approvals

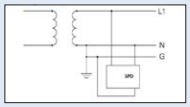
Surge arresters - Class II- SAP Line UL1449 3rd Edition

1P devices

In (A)	Imax	Service voltage	MCOV Uc	Auxiliary contact	No. of modules(1)	Cat. No.	Pack.
20	40	120V	175	no	1	SAP1II40175(2)	1
20	40	240V	275	no	1	SAP1II40275	1
20	40	277V	320	no	1	SAP1II40320	1
20	40	120V	175	yes	1	SAP1II40175C(2)	1
20	40	240V	275	yes	1	SAP1II40275C	1
20	40	277V	320	yes	1	SAP1II40320C	1

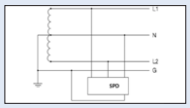
Single phase system

In (A)	Imax	Service voltage	MCOV Uc	Auxiliary contact	No. of modules(1)	Cat. No.	Pack.
20	40	120V single phase	175	no	2	SAP2II40175(2)	1
20	40	240V single phase	320	no	2	SAP2II40320	1
20	40	277V single phase	320	no	2	SAP2II40320	1
20	40	120V single phase	175	yes	2	SAP2II40175C(2)	1
20	40	240V single phase	320	yes	2	SAP2II40320C	1
20	40	277V single phase	320	yes	2	SAP2II40320C	1



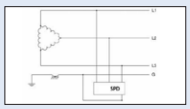
Split phase system

In (A)	Imax	Service voltage	MCOV Uc	Auxiliary contact	No. of modules(1)	Cat. No.	Pack.
20	40	240V/120V split phase	175	no	3	SAP3II40175(2)	1
20	40	480V/240V split phase	320	no	3	SAP3II40320	1
20	40	240V/120V split phase	175	yes	3	SAP3II40175C(2)	1
20	40	480V/240V split phase	320	yes	3	SAP3II40320C	1



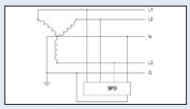
Delta system

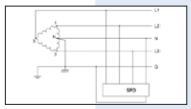
In (A)	Imax	Service voltage	MCOV Uc	Auxiliary contact	No. of modules(1)	Cat. No.	Pack.
20	40	240V Delta	320	no	3	SAP3II40320	1
10	30	600V Delta	750V	yes	3	SAP3II30750	1
20	40	240V Delta	320	yes	3	SAP3II40320C	1
10	30	600V Delta	750	yes	3	SAP3II30750C	1



HLD System
Wye System

In (A)	Imax	Service voltage	MCOV Uc	Auxiliary contact	No. of modules(1)	Cat. No.	Pack.
20	40	240V/120V High Leg Delta	320	no	4	SAP4II40320	1
20	40	240V/120V High Leg Delta	320	yes	4	SAP4II40320C	1
20	40	480Y/277V Wye system	320	no	4	SAP4II40320	1
20	40	480Y/277V Wye system	320	yes	4	SAP4II40320C	1
20	40	208Y/120V Wye System	175	no	4	SAP4II40175(2)	1
20	40	208Y/120V Wye System	175	yes	4	SAP4II40175C(2)	1





Pluggable cartridges

In (A)	Imax	MCOV Uc	Cartridges replacement In	Cat. No.	Pack.
20	40	175	SAP1II40175; SAP1II40175C; SAP2II40175; SAP2II40175C; SAP3II40175; SAP3II40175C; SAP4II40175; SAP4II40175C	SAMII40175(2)	1
20	40	275	SAP1II40275; SAP1II40275C	SAMII40275	1
20	40	320	SAP1II40320; SAP1II40320C; SAP2II40320; SAP2II40320C; SAP3II40320; SAP3II40320C; SAP4II40320	SAMII40320	1
10	30	750	SAP3II30750; SAP3II30750C	SAMII30750	1

(1) 1 mod. = 0.71in.(18mm)
(2) Ask for availability. Under Type approval.

ElfaPlus with UL approvals

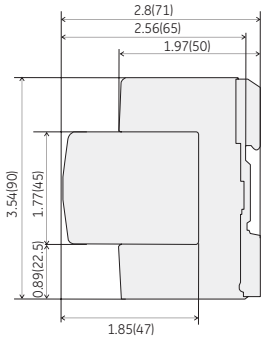
Technical features

Cat. No.		SAP1II40/175	SAP1II40/275	SAP1II40/320
Communication models Cat. No.		**SAP1II40/175C**	**SAP1II40/275C**	**SAP1II40/320C**
UL File		-	E468805	E468805
Designation according UL 1449 4th Edition		SPD Type 2CA	SPD Type 2CA	SPD Type 2CA
Maximum continuous operating voltage	MCOV (V)	175	275	320
Nominal discharge current (8/20 µ)	I_n (kA)	20	20	20
Voltage protection rating	VPR (V)	700	900	1000
Short circuit current rating	SCCR (kA)	100	85	100
Designation according to EN 61643-11/IEC 61643-1		Type 2/Class II	Type 2/Class II	Type 2/Class II
Nominal voltage AC 50-60Hz	U_n (V)	120	230	277
Max. continuous operating voltage	U_C (V)	175	275	320
Max. discharge current (8/20 µs)	I_{max} (kA)	40	40	40
Voltage protection level	U_P (kV)	≤1	≤1,3	≤1,4
Response time	t_A (ns)	≤25	≤25	≤25
Max. mains-side overcurrent protection	(A gL/gG)	125	125	125
Short-circuit withstand capability for max. mains-side overcurrent protection	Icc (kA)	25	25	25
Temporary overvoltage (TOV)	U_T (V)	337/5sec.	337/5sec.	337/5sec.
TOV characteristics		withstand	withstand	withstand
Operating temperature range (parallel)/(series)	T_U °F(°C)	-40°...185°(-40°...+85°)	-40°...185°(-40°...+85°)	-40°...185°(-40°...+85°)
Operating state/fault indication		green/red	green/red	green/red
Number of ports		1	1	1
Cross-sectional area (min.)		6mm² solid/flexible	6mm² solid/flexible	6mm² solid/flexible
Cross-sectional area (max.)		35mm² stranded/ 25mm² flexible	35mm² stranded/ 25mm² flexible	35mm² stranded/ 25mm² flexible
For mounting on		36mm DIN-rail acc. to EN 60715	36mm DIN-rail acc. to EN 60715	36mm DIN-rail acc. to EN 60715
Enclosure material		PA+FG UL94 V-0	PA+FG UL94 V-0	PA+FG UL94 V-0
Location category		indoor	indoor	indoor
Degree of protection		IP 20	IP 20	IP 20
Capacity		1 mod/phase DIN 43880	1 mod/phase DIN 43880	1 mod/phase DIN 43880
Approvals, Certifications		UL, CE	UL, CE	UL, CE
Type of remote signalling contact		changeover contact (C models)	changeover contact (C models)	changeover contact (C models)
Switching capacity a.c. (Pollution degree = 2)		250V/1A (C models)	250V/1A (C models)	250V/1A (C models)
Switching capacity a.c. (Pollution degree = 3)		125V/3A (C models)	125V/3A (C models)	125V/3A (C models)
Cross-sectional area for remote signaling terminals		max 1.5mm² solid/flexible	max 1.5mm² solid/flexible	max 1.5mm² solid/flexible

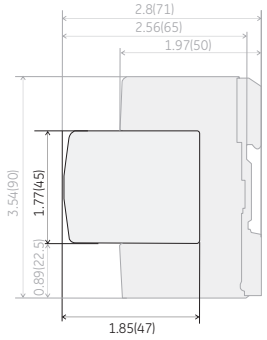
Dimensional drawings in.(mm)

Surge Protection Devices (SPDs) - SAP, SAPV, SAM

PLUG-IN types



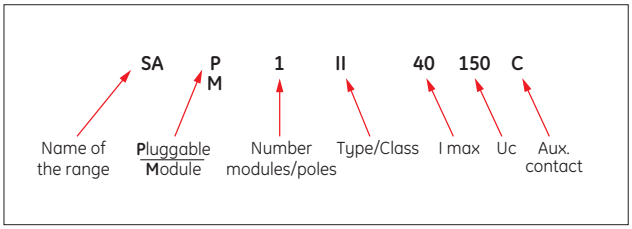
Replacement modules



ElfaPlus with UL approvals

SAP2II40/175	SAP2II40/320	SAP3II40/175	SAP3II40/320	SAP3II30/750	SAP4II40/175	SAP4II40/320
SAP2II40/175C	**SAP2II40/320C**	**SAP3II40/175C**	**SAP3II40/320C**	**SAP3II30/750C**	**SAP4II40/175C**	**SAP4II40/320C**
-	E468805	-	E468805	E468805	-	E468805
SPD Type 2CA	SPD Type 2CA	SPD Type 2CA	SPD Type 2CA	SPD Type 2CA	SPD Type 2CA	SPD Type 2CA
175	320	175	320	750	175	320
20	20	20	20	10	20	20
700	1000	700	1000	2500	700	1000
100	100	100	100	50	100	100
Type 2/Class II	Type 2/Class II	Type 2/Class II	Type 2/Class II	Type 2/Class II	Type 2/Class II	Type 2/Class II
120	277	120	277	600	120	277
175	320	175	320	750	175	320
40	40	40	40	30	40	40
≤1	≤1,4	≤1	≤1,4	≤3	≤1	≤1,4
≤25	≤25	≤25	≤25	≤25	≤25	≤25
125	125	125	125	63	125	125
25	25	25	25	25	25	25
337/5sec. withstand	337/5sec. withstand	337/5sec. withstand	337/5sec. withstand	337/5sec. withstand	337/5sec. withstand	337/5sec. withstand
-40°...185°(-40°...+85°)	-40°...185°(-40°...+85°)	-40°...185°(-40°...+85°)	-40°...185°(-40°...+85°)	-40°...185°(-40°...+85°)	-40°...185°(-40°...+85°)	-40°...185°(-40°...+85°)
green/red	green/red	green/red	green/red	green/red	green/red	green/red
1	1	1	1	1	1	1
6mm² solid/flexible	6mm² solid/flexible	6mm² solid/flexible	6mm² solid/flexible	6mm² solid/flexible	6mm² solid/flexible	6mm² solid/flexible
35mm² stranded/ 25mm² flexible	35mm² stranded/ 25mm² flexible	35mm² stranded/ 25mm² flexible	35mm² stranded/ 25mm² flexible	35mm² stranded/ 25mm² flexible	35mm² stranded/ 25mm² flexible	35mm² stranded/ 25mm² flexible
36mm DIN-rail acc. to EN 60715	36mm DIN-rail acc. to EN 60715	36mm DIN-rail acc. to EN 60715	36mm DIN-rail acc. to EN 60715	36mm DIN-rail acc. to EN 60715	36mm DIN-rail acc. to EN 60715	36mm DIN-rail acc. to EN 60715
PA+FG UL94 V-0	PA+FG UL94 V-0	PA+FG UL94 V-0	PA+FG UL94 V-0	PA+FG UL94 V-0	PA+FG UL94 V-0	PA+FG UL94 V-0
indoor	indoor	indoor	indoor	indoor	indoor	indoor
IP 20	IP 20	IP 20	IP 20	IP 20	IP 20	IP 20
1 mod/phase DIN 43880	1 mod/phase DIN 43880	1 mod/phase DIN 43880	1 mod/phase DIN 43880	1 mod/phase DIN 43880	1 mod/phase DIN 43880	1 mod/phase DIN 43880
UL, CE	UL, CE	UL, CE	UL, CE	UL, CE	UL, CE	UL, CE
changeover contact (C models)	changeover contact (C models)	changeover contact (C models)	changeover contact (C models)	changeover contact (C models)	changeover contact (C models)	changeover contact (C models)
250V/1A (C models)	250V/1A (C models)	250V/1A (C models)	250V/1A (C models)	250V/1A (C models)	250V/1A (C models)	250V/1A (C models)
125V/3A (C models)	125V/3A (C models)	125V/3A (C models)	125V/3A (C models)	125V/3A (C models)	125V/3A (C models)	125V/3A (C models)
max 1.5mm² solid/flexible	max 1.5mm² solid/flexible	max 1.5mm² solid/flexible	max 1.5mm² solid/flexible	max 1.5mm² solid/flexible	max 1.5mm² solid/flexible	max 1.5mm² solid/flexible

Catalog number guide for ElfaPlus line surge protective devices



Examples

SA	P	1	II	40	175	-
SA	P	2	II	40	320	-
SA	P	3	II	40	320	-
SA	P	3	II	30	750	-
SA	P	1	II	40	175	C
SA	P	2	II	40	320	C
SA	P	3	II	40	320	C
SA	P	3	II	30	750	C

UL1449 3rd edition, DIN-rail

SPDs for photovoltaic application

SAPV is the series of devices that provide advanced overvoltage protection to photovoltaic systems by utilizing GE's optimized dynamic thermal disconnection system, which does not require additional overcurrent protection (back-up fuse) due to its high short-circuit withstand rating.
These surge protective devices are suitable for all PV applications: large-scale, rooftop and self-consumption (off-grid) DC installations.

Ratings and features

- Maximum discharge current (8/20µs): 40kA
- Nominal discharge current (8/20µs): 20kA (10kA for 1500V DC)
- Ucpv: 660, 1060 Vdc and 1500V DC
- Iscpv: 10kA (EN-50539-11), no back-up fuse required
- SCCR: 50kA, 65kA, 100kA (UL1449 3rd edition)
- DIN-rail mountable, plug-in format
- Visual and remote end of life indicators

Surge arresters - Class II- SAPV Line UL1449 3rd Edition

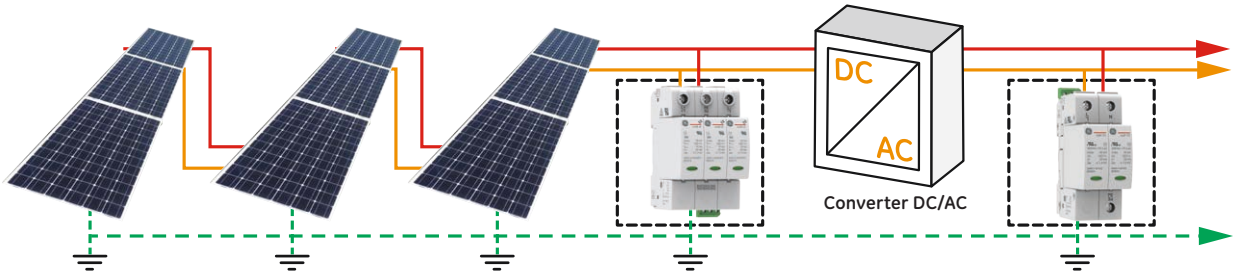
	In (kA)	Imax	Service voltage AC/DC/DC PV	MCOV Uc	Up (Ures)	Auxiliary contact	No. of modules(1)	Cat. No.	Pack.
Photovoltaic application	20	40	600 DC PV	600	2600	no	3	SAPVII40/600	1
	20	40	600 DC PV	600	2600	yes	3	SAPVII40/600C	1
	20	40	1000 DC PV	1000	4000	no	3	SAPVII40/1000	1
	20	40	1000 DC PV	1000	4000	yes	3	SAPVII40/1000C	1
	10	40	1500 DC PV	1500	5000	no	3	SAPVII40/1500	1
	10	40	1500 DC PV	1500	5000	yes	3	SAPVII40/1500C	1

(1) 1 mod. = 0.71in.(18mm)

Pluggable cartridges

In (kA)	Imax	Service voltage AC/DC/DC PV	To be replaced in		Cat. No.	Pack.
20	40	600 DC PV	SAPVII40/600	SAPVII40/600C	SAMII40/600PV	1
20	40	1000 DC PV	SAPVII40/1000	SAPVII40/1000C	SAMII40/1000PV	1
10	40	1500 DC PV	SAPVII40/1500	SAPVII40/1500C	SAMII40/1500PV	1

Installation of SAP SPDs on photovoltaic networks

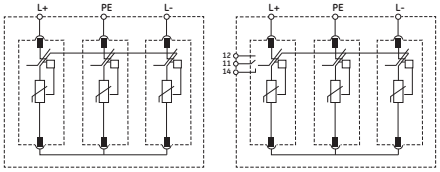


SAPV II 40

UL1449 3rd edition, DIN-rail

Three pole transient surge protector

Internal configuration



Technical features

Cat. No.		SAP3II40/600	SAP3II40/1000	SAP3II40/1500
Communication models Cat. No.		**SAP3II40/600C**	**SAP3II40/1000C**	**SAP3II40/1500C**
UL File		E468805	E468805	E468805
Designation according UL 1449 3rd Edition		PV SPD Type 2CA	PV SPD Type 2CA	PV SPD Type 2CA
Maximum continuous operating voltage	MCOV (V)	600	1000	1500
Nominal discharge current (8/20 µs)	I_n (kA)	20	20	10
Voltage protection rating	VPR (V)	1800	3000	4000
Short circuit current rating	SCCR (kA)	100	50	65
Designation according to EN 50539-11		Type 2	Type 2	Type 2
Maximum continuous operating voltage DC	U_{CVP} (V)	660	1060	1500
Max. Discharge current (8/20 µs)	I_{max} (kA)	40	40	20
Short-circuit withstand capability for max. mains-side overcurrent protection	I_{SCVP} (kA)	10	10	10
Voltage protection level	Up (kV)	≤ 2.6	≤ 4	≤ 5
Response time	t_A (ns)	≤ 25	≤ 25	≤ 25
Operating temperature range (parallel)/(series)	T_U °F(°C)	-40°...185°(-40°...+85°)		
Operating state/fault indication		green/red		
Number of ports		1		
Cross-sectional area [min.]		6mm² solid/flexible		
Cross-sectional area [max.]		35mm² stranded/25mm² flexible		
For mounting on		36mm DIN rail acc. To EN 60715		
Enclosure material		PA+FG UL94 V-0		
Location category		indoor		
Degree of protection		IP 20		
Capacity		1 mod/phase DIN 4388		
Approvals, Certifications		UL, CE		
Type of remote signaling contact		changeover contact (C models)		
Switching capacity a.c.		250V / 1A (C models)		
Switching capacity d.c.		125V / 0,2A (C models)		
Cross-sectional area for remote signaling terminals		max 1.5 mm² solid / flexible (C models)		

Accessories. Replacement modules

Cat. No.	SAMII40/600PV	SAMII40/1000PV	SAMII40/1500PV
	Protection module phase-neutral for		
	SAPVII40/600	SAPVII40/1000	SAPVII40/1500
	SAPVII40/600C	SAPVII40/1000C	SAPVII40/1500C

Energy management

What is electrical energy efficiency?

Electrical energy efficiency is understood as the reduction in power and energy demands from the electrical system without affecting the normal activities carried out in buildings, industrial plants or any other transformation process.

Additionally, an energy efficient electrical installation allows the economical and technical optimization. That is, the reduction of technical and economical costs of operation.

In short, a study on energy savings and efficiency will involve three basic points:

- Support the sustainability of the system and the environment by reducing greenhouse emissions as a result of reducing the energy demand.
- Improving the technical management of the installations by increasing its efficiency and avoiding stoppages and breakdowns.
- Reduction of energy costs as well as the operating costs of the installations.

From a technical point of view, four basic points are considered in order to have a more efficient electrical installation.

Contract optimizing | Measurement systems | Demand management
Productivity improvement by controlling perturbances and costs.

(1) MT96 only available under EN/IEC standards

Basic questions about electrical energy efficiency

With the four basic points explained, we put forth a series of questions on each point. The questions hope to identify the objectives to work on, in order to obtain an efficient electrical installation.

Contract optimizing

Is your electric contract the most suitable one for your needs?

Do you know that a bad power quality can affect your activities or production processes?

Measurement systems

Do you know how, when and where you are using the electrical energy?

Do you really think that all your energy consumed is the most accurate one?

Demand management

Could you reduce the consumption of electrical energy without affecting the processes or activities carried out?

Would it be possible to improve the technical efficiency of your electrical installations?

Productivity improvement

Is there any way to avoid breakdowns and stoppages on your electrical equipment and installations?

Then, could you improve the productivity of your processes?

Outline of a study of electrical energy efficiency

The first step in a **process of electrical energy** efficiency is to carry out an **electrical energy diagnosis and audit.** In this process, measurements of power and energy will be taken, as well as other variables necessary for making the suitable decisions.

Along those lines, two key points should be taken into consideration:

What information do we attempt to get from the measurements?

Which are the right points to be measured?

In all cases, there is one way to carry out the audit:

Measurements must be taken **using MT DIN & MT144 UL measuring equipment.** This equipment permits storing all the variables selected in their memory (power, energy, etc.).

The number of measurements agree with the number of points that are considered to be critical or necessary.

Depending on the type of process, the duration of each measurement will be determined. The aim is to represent the true state of the point measured.

This equipment permits great flexibility and it also allows you to follow up on the energy consumption after the appropriate decisions have been made.

It is recommended that you study the points where the measurements are taken for the subsequent installation of a fixed measurement system that communicates with the management software.

Compact three-phase analyzer

UL listed, MT DIN-rail and panel adaptor

IEC 664, VDE 0110, UL94,
IEC 801, IEC 348, IEC 571-1,
EN 61000-6-3, EN 61000-6-1,
EN 61010-1

Key features

- Current measuring .../5 or .../1A
- DIN-rail format with only 3 modules (52mm).
- Assembly on the 72 x 72mm panel with frontal adaptor (Ref. No. 665244).
- RS485 communications (Modbus-RTU).
- Two transistor outputs.
- Optional ITF technology: galvanic insulation for inputs.
- Instantaneous display of important electrical parameters.
- Sealable
- Very small dimension
- Measuring in 4 quadrants.

Applications

- Control switchboards for low and medium voltage applications where DIN-rail mounting is preferred due to size restraints.
- Allows the measurement of electrical variables utilized for the effective control of systems.

Description

Three-phase power analyzer (balanced and unbalanced) for mounting on DIN-rail. Also adaptable for panel mounting with 2.83 in. x 2.83 in. (72 x 72mm) dimension.

Features

UL FILE: E356776	
Power supply circuit	230V AC (-15% to +10%) or 85 to 265V AC / 95 to 300V DC
Consumption	3VA
Frequency	50 or 60Hz
Nominal current (In)	5A
METERING CIRCUIT	
Maximum voltage	300V AC (Ph-N) / 520V AC (Ph-Ph)
Frequency	45 to 65Hz
Voltage consumption of the circuit	0.7VA
Current consumption of the circuit	0.9VA (ITF) /0.75VA (shunt)
Nominal current	In / 5A
Permanent overload	1.2 In
CLASS/ACCURACY	
Voltage	0.5% ±1 digit
Current	0.5% ±1 digit
Power rating	1% ±1 digit
AMBIENT CONDITIONS	
Operating temperature	14°F up to 122°F (-10°C up to +50°C)
Relative humidity (non-condensing)	5% up to 95%
Output transistor	Opto-isolated (open collector) NPN
Max. operating voltage	24V DC
Max. operating current	50mA
Max. impulse frequency	5 impulse / s
Duration of the impulse	100 ms
HOUSING	
Type of box	VO self-extinguishing plastic
Degree of protection	Embedded equipment: IP41 Terminals: IP20
Dimensions (H x W x D)	3.35 x 2.1 x 2.67 in. (85 x 52.5 x 67.9mm) (3 modules)
Weight	7.41 oz (210 g)
Safety	Designed for CAT III 300/520V AC installations, in accordance with EN 61010. Class II double insulated for protection against electric shock

ElfaPlus with UL approvals

UL listed compact three-phase power analyzer - Series MTDIN

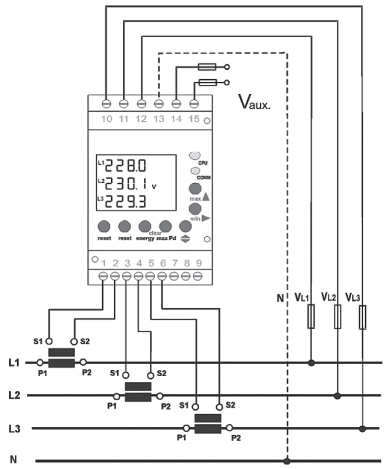
Mod.	Class (V, A)	Communi-cation	Protocol	Output	Voltage	Cat. No.	Pack
3	0.5	-	-	-	85 to 265V AC 95 to 300V AC	MTDIN1	1
3	0.5	-	-	-	230V AC	MTDIN2	1
3	0.5	RS485	ModBus/RTU	2	230V AC	MTDIN2COM	1
3	0.5	RS485	ModBus/RTU	2	85 to 265V AC 95 to 300VDC	MTDIN1HARCOM	1

Accessories

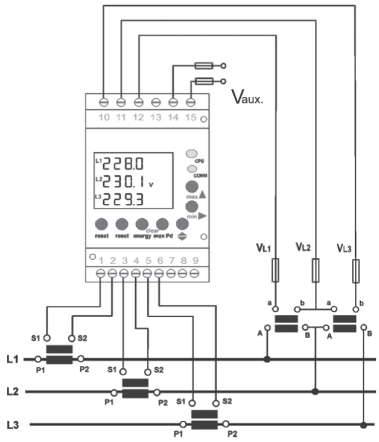
Description	Cat. No.	Pack
Front panel adaptor Adaptor installing MTDIN on 72 x 72mm panels. Central fixing. Adjustable on the rear with two straps	MTAdapt	1

Connections

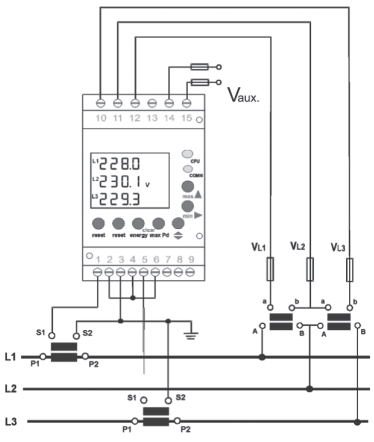
3 or 4 wires (low voltage)



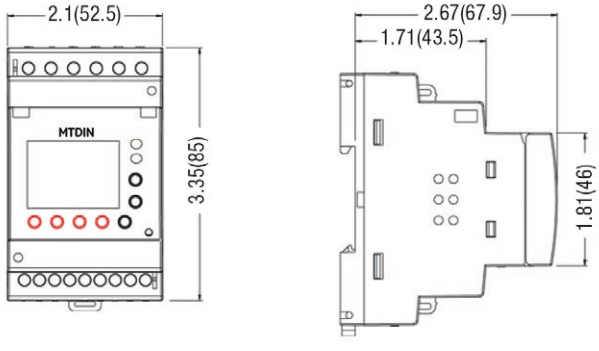
3 wires (2 voltage transformers and 3 current transformers)



3 wires (2 voltage transformers and 2 current transformers)



Dimensional drawings in.(mm)



Key features

- Class 0.2 energy and power precision.
- Class B power quality analyzer.
- One display can monitor up to 32 measurement modules.
- Current measuring .../5 or .../1A
- Measure of neutral current with transformer.
- Optional energy consumption and generation billing (up to 9 rates).
- Expansion possibilities (up to 3 modules).
- RS485 Modbus/RTU communications.
- Profibus GSD module available.
- SD memory module with max capacity of 2 GB available.
- Backlit VGA graphical display.
- Instantaneous display of maximum and minimum electrical parameters with date and hour.
- Measure of energy consumed and generated, up to 100 GWh.
- Up to 8 digital inputs and outputs available.
- ITF technology: galvanic insulation for inputs.

Approvals / Marking

c UL US LISTED CE

Three-phase power analyzer and power quality

UL listed, MT 144 Door mounted network analyzer

EMC: IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-11, IEC 61000-4-4, IEC 61000-4-5

Listed for industrial control equipment miscellaneous device.

Applications

- Control switchboards for low and medium voltage applications.
- Alarm center by means of voltage-free digital inputs.
- Submetering: can measure through impulses other types of consumption, such as gas, water, steam, etc. via their digital inputs.
- Measurement converters: possible to associate instantaneous parameter to one of the analog outputs (0 to 20mA / 4 to 20mA).
- Recording of instantaneous, maximum, and minimum parameters with a date and hour by means of an expandable memory card.
- Power quality analyzer: harmonic decomposition up to order 50°, asymmetries, flicker, unbalances, overvoltages, gaps, interruptions, etc.

Description

Three-phase advanced power analyzer for panel mounting with a 5.7 in. x 5.7 in. (144 x 144 mm) front dimension.

Features

UL FILE	E356776
Power supply circuit	85 to 265V AC and 95 to 300V DC
AC power supply frequency	50/60Hz
AC pow. supp. consumption	3VA
DC pow. supp. consumption	< 25W
METERING CIRCUIT	
Voltage	15 to 360V AC (L-N) 26 to 600V AC (L-L)
Frequency	45 to 65Hz
Metering margin	5 to 120% Un
Admissible overvoltage	750V AC
Voltage consumption of the circuit	< 0.5VA
CURRENT MEASURING CIRCUIT	
Nominal current (In)	5A or 1A
Metering range	1 to 120% of In
Primary current metered	Programmable < 30000A
Admissible overload	6A permanent, 100A t < 1s
Current consumption of the circuit	< 0.45VA
Maximum meter value	100GWh
Class/Accuracy	0.2 or 0.5 power and energy
AMBIENT CONDITIONS	
Operating temperature	14°F up to 122°F (-10°C up to +50°C)
Relative humidity	5% up to 95%
HOUSING	
Metering module	Assembly on DIN-rail 46277 (EN 50022)
Screen or screen + metering module	Assembly on panel 3.8 in. x 3.8 in., 5.7 in. x 5.7in. (96 x 96mm, 144 x 144mm) or opening with a 4.1in. (103mm) Ø
Dimensions (H x W x D)	5.7 in. x 5.7 in. x 4.6 in. (144 x 144 x 116mm)
Safety	Designed for CAT III 300/520V AC installations, in accordance with EN 61010. Class II double insulated for protection against electric shock

ElfaPlus with UL approvals

Compact units (metering + display module) - Series MT144

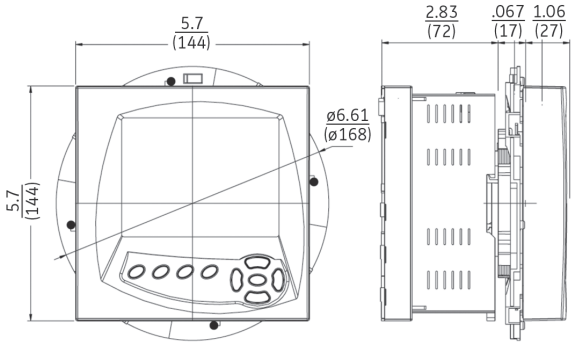
Quadrants	Class (V, A)	Communication	Protocol	Neutral current	Universal power supply	Harmonics	Cat. No.
4	0.2	RS485	ModBus/RTU	Yes	85 to 265V AC 95 to 300V DC	U and I (50%)	MT144UMD

Measuring units (measuring module and display sold separately) - Series MT144

	Quadrants	Class (V, A)	Communication	Protocol	Neutral current	Universal power supply	Harmonics	Cat. No.
Measuring module	4	0.2	RS485	ModBus/RTU	Yes	85 to 265V AC 95 to 300V DC	U and I (50%)	MT144UM
VGA display	4	-	-	-	Yes	-	-	MT144UD

For other versions, contact GE or your local distributor.

Dimensional drawings in.(mm)



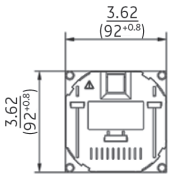


Fig. 1

Fig. 2
Holes guide

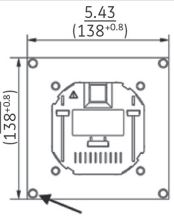
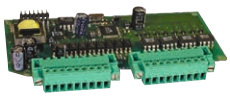


Fig. 3
Lock points

Figure above illustrates how the front display mounts on the panel either with a 3.62 in. x 3.62 in. (92x92mm) square cutout or a circular cutout with a diameter of 4.33 in. (110mm). View is the rear of the display module.

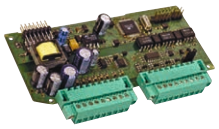
Exchangeable cards



8I/8O digital expansion card

MT8I80	1

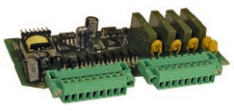
8 digital inputs and
8 digital outputs.
Outputs with opto-coupled transistor.



8I/4O analog expansion card

MT8I40	1

8 analog inputs and
4 analog outputs



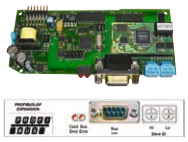
8I/4O digital expansion card

MT8I40R	1

8 digital inputs and
4 digital outputs.
Outputs with relay.

ProfiBus expansion card - GSD modules

MTPBUS	1



Ethernet and SD memory card

MTMBUS	1

Ethernet communications card and SD memory.

SD memory expansion card

MTSDMEM	1

Common accessories for MTDIN, MT96 and MT144 - Converters

Converter for RS232/485 to Ethernet (and vice-versa)

MT485Enet	1

Power supply 85...265VAC / 115...374VDC.
Ethernet speed: 10/100 BaseTX
RS Bus transmission speed: 1200 bps to 115200 bps.

USB converter to RS232 or RS485

MTUSB485	1

Converter from USB network protocol to RS232 or RS485.
Power supply through the PC's USB port.
Transmission speed: 4800 to 128000 bps.

ElfaPlus with UL approvals

Power Analyzers - Parameter table

	MTDIN				MT144				
									
MEASUREMENT	**L1**	**L2**	**L3**	**III**	**L1**	**L2**	**L3**	**N**	**III**
Single phase voltage	•	•	•		•	•	•		•
Phase phase voltage	•	•	•		•	•	•		
Reference voltage (GND)-neutral								•	
Current	•	•	•	•	•	•	•	•	
Frequency	•				•				
Active power	•	•	•	•	•	•	•		•
Reactive power L (inductance)	•	•	•	•	•	•	•		•
Reactive power C (capacitance)	•	•	•	•	•	•	•		•
Apparent power	•	•	•	•	•	•	•		•
Power factor	•	•	•	•	•	•	•		•
Cosine				•	•	•	•		•
Maximum active power demand				•					•
Maximum apparent power demand				•					•
Maximum current demand	•	•	•	•	•	•	•		•
Neutral current		•					•		
THD voltage	•	•	•		•	•	•		•
THD current	•	•	•		•	•	•		•
Voltage harmonics	•	•		15	•	•	•	•	50
Current harmonics	•	•		15	•	•	•	•	50
Active energy				•					•
Reactive energy L				•					•
Reactive energy C				•					•
Apparent energy				•					•
Flicker (WA and PST)					•	•	•		
Factor K (current)					•	•	•		
Peak factor (voltage)					•	•	•		
Unbalance (voltage and current)					•	•	•		
Asymmetry (voltage and current)					•	•	•		
Rates (optional)							9		
Analog inputs (0/4 20mA)							•		
Analog outputs (0/4 20mA)							•		
Digital inputs							•		
Digital outputs							•		
COMMUNICATIONS									
RS232									
RS485							•		
Ethernet							•		
PROTOCOLS									
Modbus RTU							•		
Modbus TCP							•		
Profibus DP (optional)							•		

• Available for display and communications

Communication and software

Communication and monitoring of various GE devices and the creation of screens and reports

This software contains 3 main modules

The editor is the module that is in charge of applications management and it allows a new application to be created, to modify an existing application, to import an application from the engine or to export an application to the engine.

The engine is the module in charge of running the application it receives from the editor and of communicating with the different connected devices, storing downloads and attending to the various requests made by both the editor and the client.

The engine can be loaded in the customer server in order to monitor and save all parameters from connected Power analyzers.

The client is the module that allows connection with an engine and access to the SCADA screens, reports and to view the instantaneous values recorded by the devices.

Graphs and listings can also be prepared of the recorded values, events can be viewed, the status of the devices can be displayed, etc.

Client Options

Screen visualization
Report visualization
Device status report
Devices visualization
Graphics

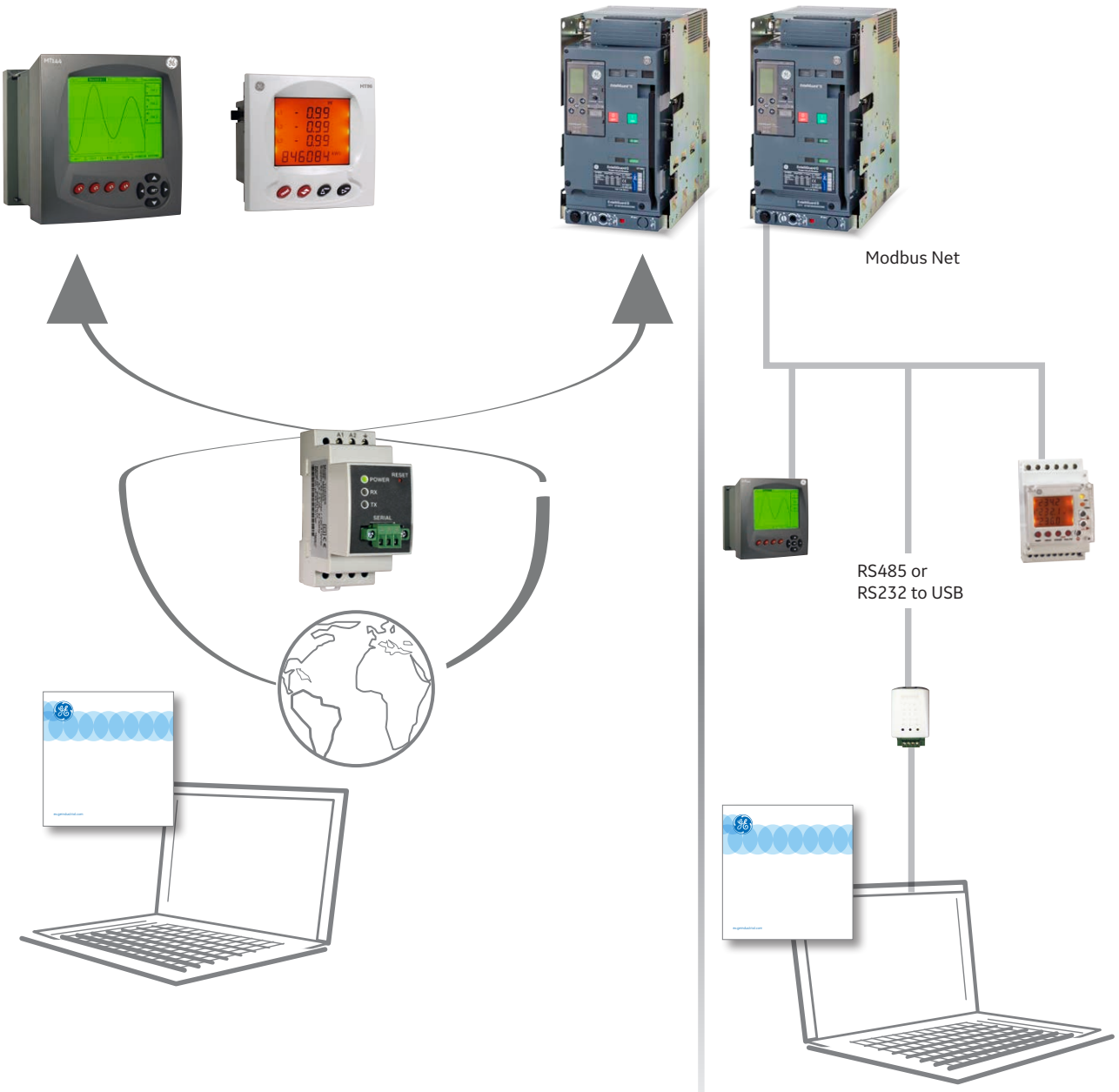
1 Zoom mode
2 Pan mode
3 Tooltip mode
4 Lens mode
5 Toolbar
6 Graphics properties
7 Graphics print
8 Graphics export
9 Graphics types.

Tables
Historic events visualization
Active and notified events

The most powerful typical application is to get multiple tariffs recorded in the engine, and programmed in the editor, to be visualized in the client, even if the Power analyzer does not have multiple tariffs in its configuration.

Devices to communicate through MODBUS or Converter MT485Enet

The most powerful typical application is to get multiple tariffs recorded in the engine, and programmed in the editor.



Numerical index and list pricing

ElfaPlus with UL approvals

Cat. No.	Page	List Price
ASUL	C.11	$105.00
ASUL2	C.11	$105.00
BS1PULL600/06	C.11	$96.00
BS1PULL600/12	C.11	$177.00
BS1PULR277/12	C.11	$87.00
BS1PULR480/12	C.11	$108.00
BS1PULR480/12	C.11	$129.00
BS2PUL600/12	C.11	$189.00
BS2PULL600/06	C.11	$102.00
BS3PULL600/06	C.11	$108.00
BS3PULL600/12	C.11	$198.00
CAH	C.5	$34.00
CAS/H	C.5	$17.82
CAS/HG	C.5	$59.00
CBSH/HH-L	C.6	$87.00
CBSH/HH-R	C.6	$59.00
DPA100B10/010	B.7	$274.80
DPA100B10/030	B.7	$274.80
DPA100B13/010	B.7	$274.80
DPA100B13/030	B.7	$274.80
DPA100B16/010	B.7	$274.80
DPA100B16/030	B.7	$274.80
DPA100B20/010	B.7	$274.80
DPA100B20/030	B.7	$274.80
DPA100B25/030	B.7	$274.80
DPA100B32/030	B.7	$274.80
DPA100C10/010	B.7	$274.80
DPA100C10/030	B.7	$274.80
DPA100C13/010	B.7	$274.80
DPA100C13/030	B.7	$274.80
DPA100C16/010	B.7	$274.80
DPA100C16/030	B.7	$120.73
DPA100C20/010	B.7	$274.80
DPA100C20/030	B.7	$274.80
DPA100C25/030	B.7	$274.80
DPA100C32/030	B.7	$274.80
DPLA100B10/010	B.7	$274.80
DPLA100B10/030	B.7	$274.80
DPLA100B13/010	B.7	$274.80
DPLA100B13/030	B.7	$274.80
DPLA100B16/010	B.7	$274.80
DPLA100B16/030	B.7	$274.80
DPLA100B20/010	B.7	$274.80
DPLA100B20/030	B.7	$274.80
DPLA100B25/030	B.7	$274.80
DPLA100B32/030	B.7	$274.80
DPLA100C10/010	B.7	$274.80
DPLA100C10/030	B.7	$274.80
DPLA100C13/010	B.7	$274.80
DPLA100C13/030	B.7	$274.80
DPLA100C16/010	B.7	$274.80
DPLA100C16/030	B.7	$274.80
DPLA100C20/030	B.7	$274.80
DPLA100C25/030	B.7	$274.80
DPLA100C32/030	B.7	$274.80
EP101ULB05	A.17	$97.00
EP101ULB06	A.17	$97.00
EP101ULB10	A.17	$97.00
EP101ULB13	A.17	$97.00
EP101ULB15	A.17	$97.00
EP101ULB16	A.17	$97.00
EP101ULB20	A.17	$97.00
EP101ULB25	A.17	$97.00
EP101ULB30	A.17	$97.00
EP101ULB32	A.17	$97.00
EP101ULB40	A.17	$107.00
EP101ULB50	A.17	$113.00
EP101ULB60	A.17	$119.00
EP101ULB63	A.17	$119.00
EP101ULC0.5	A.17	$116.00
EP101ULC01	A.17	$97.00
EP101ULC02	A.17	$97.00
EP101ULC03	A.17	$97.00
EP101ULC04	A.17	$97.00
EP101ULC05	A.17	$97.00
EP101ULC06	A.17	$97.00
EP101ULC10	A.17	$97.00
EP101ULC13	A.17	$97.00
EP101ULC15	A.17	$97.00
EP101ULC16	A.17	$97.00
EP101ULC20	A.17	$97.00
EP101ULC25	A.17	$97.00
EP101ULC30	A.17	$97.00
EP101ULC32	A.17	$97.00
EP101ULC40	A.17	$107.00
EP101ULC50	A.17	$113.00
EP101ULC60	A.17	$119.00
EP101ULC63	A.17	$119.00
EP101ULD0.5	A.17	$116.00
EP101ULD01	A.17	$97.00
EP101ULD02	A.17	$97.00
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EP101ULH1B40	A.15	$113.22
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ElfaPlus with UL approvals

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EP104ULC16	A.17	$401.00
EP104ULC20	A.17	$401.00
EP104ULC25	A.17	$401.00
EP104ULC30	A.17	$401.00
EP104ULC32	A.17	$401.00
EP104ULC40	A.17	$407.00
EP104ULC50	A.17	$425.00
EP104ULC60	A.17	$437.00
EP104ULC63	A.17	$437.00
EP104ULD0.5	A.17	$448.00
EP104ULD01	A.17	$401.00
EP104ULD02	A.17	$401.00
EP104ULD03	A.17	$401.00
EP104ULD04	A.17	$401.00
EP104ULD05	A.17	$401.00
EP104ULD06	A.17	$401.00
EP104ULD10	A.17	$401.00
EP104ULD13	A.17	$401.00
EP104ULD15	A.17	$401.00
EP104ULD16	A.17	$401.00
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EP104ULD25	A.17	$401.00
EP104ULD30	A.17	$401.00
EP104ULD32	A.17	$401.00
EP104ULD40	A.17	$407.00
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EP104ULD63	A.17	$437.00
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EP61ULB16	A.19	$65.00
EP61ULB20	A.19	$65.00
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EP61ULB32	A.19	$65.00
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EP61ULB63	A.19	$80.00
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EP61ULC06	A.19	$65.00
EP61ULC10	A.19	$65.00
EP61ULC13	A.19	$65.00
EP61ULC15	A.19	$65.00
EP61ULC16	A.19	$65.00
EP61ULC20	A.19	$65.00
EP61ULC25	A.19	$65.00
EP61ULC30	A.19	$65.00
EP61ULC32	A.19	$65.00
EP61ULC40	A.19	$72.00
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EP61ULC60	A.19	$80.00
EP61ULC63	A.19	$80.00
EP61ULD0.5	A.19	$78.00
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EP61ULD02	A.19	$65.00
EP61ULD03	A.19	$65.00
EP61ULD04	A.19	$65.00
EP61ULD05	A.19	$65.00
EP61ULD06	A.19	$65.00
EP61ULD10	A.19	$65.00
EP61ULD13	A.19	$65.00
EP61ULD15	A.19	$65.00
EP61ULD16	A.19	$65.00
EP61ULD20	A.19	$65.00
EP61ULD25	A.19	$65.00
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EP61ULD40	A.19	$72.00
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EP62ULB30	A.19	$141.00
EP62ULB32	A.19	$141.00
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EP62ULB60	A.19	$164.00
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EP62ULC02	A.19	$141.00
EP62ULC03	A.19	$141.00
EP62ULC04	A.19	$141.00
EP62ULC05	A.19	$141.00
EP62ULC06	A.19	$141.00
EP62ULC10	A.19	$141.00
EP62ULC13	A.19	$141.00
EP62ULC15	A.19	$141.00
EP62ULC16	A.19	$141.00
EP62ULC20	A.19	$141.00
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EP62ULC32	A.19	$141.00
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EP62ULC60	A.19	$164.00
EP62ULC63	A.19	$164.00
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EP62ULD02	A.19	$141.00
EP62ULD03	A.19	$141.00
EP62ULD04	A.19	$141.00
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EP62ULD10	A.19	$141.00
EP62ULD13	A.19	$141.00
EP62ULD15	A.19	$141.00
EP62ULD16	A.19	$141.00
EP62ULD20	A.19	$141.00
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EP63ULB32	A.19	$204.00
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EP63ULB50	A.19	$219.00
EP63ULB60	A.19	$229.00
EP63ULB63	A.19	$229.00
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EP63ULC03	A.19	$204.00
EP63ULC04	A.19	$204.00
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EP63ULC15	A.19	$204.00
EP63ULC16	A.19	$204.00
EP63ULC20	A.19	$204.00
EP63ULC25	A.19	$204.00
EP63ULC30	A.19	$204.00
EP63ULC32	A.19	$204.00
EP63ULC40	A.19	$210.00
EP63ULC50	A.19	$219.00
EP63ULC60	A.19	$229.00
EP63ULC63	A.19	$229.00
EP63ULD0.5	A.19	$230.00
EP63ULD01	A.19	$204.00
EP63ULD02	A.19	$204.00
EP63ULD03	A.19	$204.00
EP63ULD04	A.19	$204.00
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EP63ULD15	A.19	$204.00
EP63ULD16	A.19	$204.00
EP63ULD25	A.19	$204.00
EP63ULD30	A.19	$204.00
EP63ULD32	A.19	$204.00
EP63ULD40	A.19	$210.00
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EP64ULB60	A.19	$293.00
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EP64ULC16	A.19	$269.00
EP64ULC20	A.19	$269.00
EP64ULC25	A.19	$269.00
EP64ULC30	A.19	$269.00
EP64ULC32	A.19	$269.00
EP64ULC40	A.19	$272.00
EP64ULC50	A.19	$285.00
EP64ULC60	A.19	$293.00
EP64ULC63	A.19	$293.00
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EP64ULD02	A.19	$269.00
EP64ULD03	A.19	$269.00

ElfaPlus with UL approvals

Cat. No.	Page	List Price
EP64ULD04	A.19	$269.00
EP64ULD05	A.19	$269.00
EP64ULD06	A.19	$269.00
EP64ULD10	A.19	$269.00
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EP64ULD16	A.19	$269.00
EP64ULD20	A.19	$269.00
EP64ULD25	A.19	$269.00
EP64ULD30	A.19	$269.00
EP64ULD32	A.19	$269.00
EP64ULD40	A.19	$272.00
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FPAUL225/030	B.5	$437.00
FPAUL225/100	B.5	$437.00
FPAUL225/300	B.5	$437.00
FPAUL225/500	B.5	$437.00
FPAUL240/030	B.5	$437.00
FPAUL240/100	B.5	$437.00
FPAUL240/300	B.5	$437.00
FPAUL240/500	B.5	$437.00
FPAUL263/030	B.5	$437.00
FPAUL263/100	B.5	$437.00
FPAUL263/300	B.5	$437.00
FPAUL263/500	B.5	$437.00
FPAUL425/030	B.5	$874.00
FPAUL425/100	B.5	$874.00
FPAUL425/300	B.5	$874.00
FPAUL425/500	B.5	$874.00
FPAUL440/030	B.5	$874.00
FPAUL440/100	B.5	$874.00
FPAUL440/300	B.5	$874.00
FPAUL440/500	B.5	$874.00
FPAUL463/030	B.5	$874.00
FPAUL463/100	B.5	$874.00
FPAUL463/300	B.5	$874.00
FPAUL463/500	B.5	$874.00
IcapUL1	C.11	$12.90
IcapUL2	C.11	$15.90
KS	C.11	$5.00
MT144UD	D.17	$3,882.00
MT144UM	D.17	$5,130.00
MT144UMD	D.17	$8,610.00
MT485Enet	D.17	$3,087.00
MT8I4O	D.17	$2,127.00
MT8I4OR	D.17	$1,572.00
MT8I8O	D.17	$2,175.00
MTAdapt	D.15	$57.00
MTDIN1	D.15	$1,554.00
MTDIN1HARCOM	D.15	$2,571.00
MTDIN2	D.15	$1,455.00
MTDIN2COM	D.15	$2,424.00
MTMBUS	D.17	$3,108.00
MTPBUS	D.17	$4,530.00
MTSDMEM	D.17	$2,307.00
MTUSB485	D.17	$822.00
SAMII30750	D.7	$261.41
SAMII40/1000PV	D.10	$246.84
SAMII40/1500PV	D.10	$254.28
SAMII40/600PV	D.10	$239.64
SAMII40150	D.7	N/A*
SAMII40275	D.7	$237.64
SAMII40320	D.7	$237.64
SAP1II40150	D.7	N/A*
SAP1II40150C	D.7	N/A*
SAP1II40275	D.7	$279.64
SAP1II40275C	D.7	$324.78
SAP1II40320	D.7	$279.64
SAP1II40320C	D.7	$324.78
SAP2II40150	D.7	N/A*
SAP2II40150C	D.7	N/A*
SAP2II40320	D.7	$532.65
SAP2II40320C	D.7	$649.56
SAP3II30750	D.7	$878.87
SAP3II30750C	D.7	$1,054.64
SAP3II40150	D.7	N/A*
SAP3II40150C	D.7	N/A*
SAP3II40320	D.7	$798.97
SAP3II40320C	D.7	$958.76
SAP4II40150	D.7	N/A*
SAP4II40150C	D.7	N/A*
SAP4II40320	D.7	$1,065.29
SAP4II40320C	D.7	$1,278.35
SAPVII40/1000	D.10	$542.40
SAPVII40/1000C	D.10	$755.34
SAPVII40/1500	D.10	$812.16
SAPVII40/1500C	D.10	$857.01
SAPVII40/600	D.10	$502.47
SAPVII40/600C	D.10	$698.76
TELEL-1	C.7	$90.00
TELEL-2	C.7	$90.00
TELEMP	C.9	$385.80
TELEU-12	C.8	$128.00
TELEU-230	C.8	$128.00
TELEU-24	C.8	$128.00
TELEU-48	C.8	$128.00
WUL	C.11	$5.00

* Ask for availability.

Prices and data subject to change without notice.

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GE Industrial Solutions

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