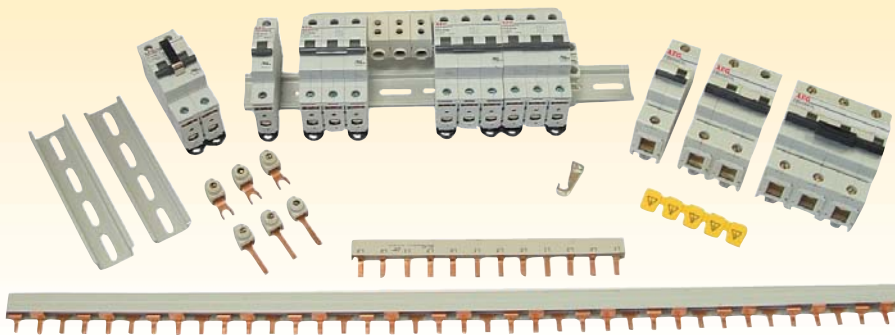


# ELFA E90S MINI BREAKERS



## **AEG** MINI BREAKERS & ACCESSORIES

- Auxiliaries
- Fault Trip Aux.
- Shunt Trip
- Undervoltage Trip
- IP55 Enclosures with window
- Lock off device
- Buss bar and infeed terminals

**AEG** - ELFA  
E90S SERIES  
UL Approved  
(UL1077)



10KA INTERRUPTION  
CAPACITY

### OPTIONS FIELD KITS

- Auxiliary Contacts
- Alarm Contact
- Shunt Trip
- UV Trip

- Current Limiting  
Design (Class 3)

### 3 Different Trip Characteristics

**B** = Resistive Electrical  
Heating

**C** = Small motors  
Transformers  
Socket outlets

**D** = Large motors  
Heavy duty  
transformers  
High / inrush loads

*Electrical Ratings to 480V*  
(E90S) 110VDC

**ELECTRICAL & ELECTRONIC  
CONTROLS, INC.**  
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<u>UL489</u> EEC Mini Circuit Breakers (Expected last quarter 2008)	
<u>UL489</u> full size series molded case circuit breakers, pages 143-147 (15A-600A) cUL Listed	



### 35mm Din Rail Mount

- Easy "two" position snap action mounting



### Safety Terminals

- Easy field installed auxiliaries
- Easy wire fixing, finger safe terminals
- Protection degree IP20



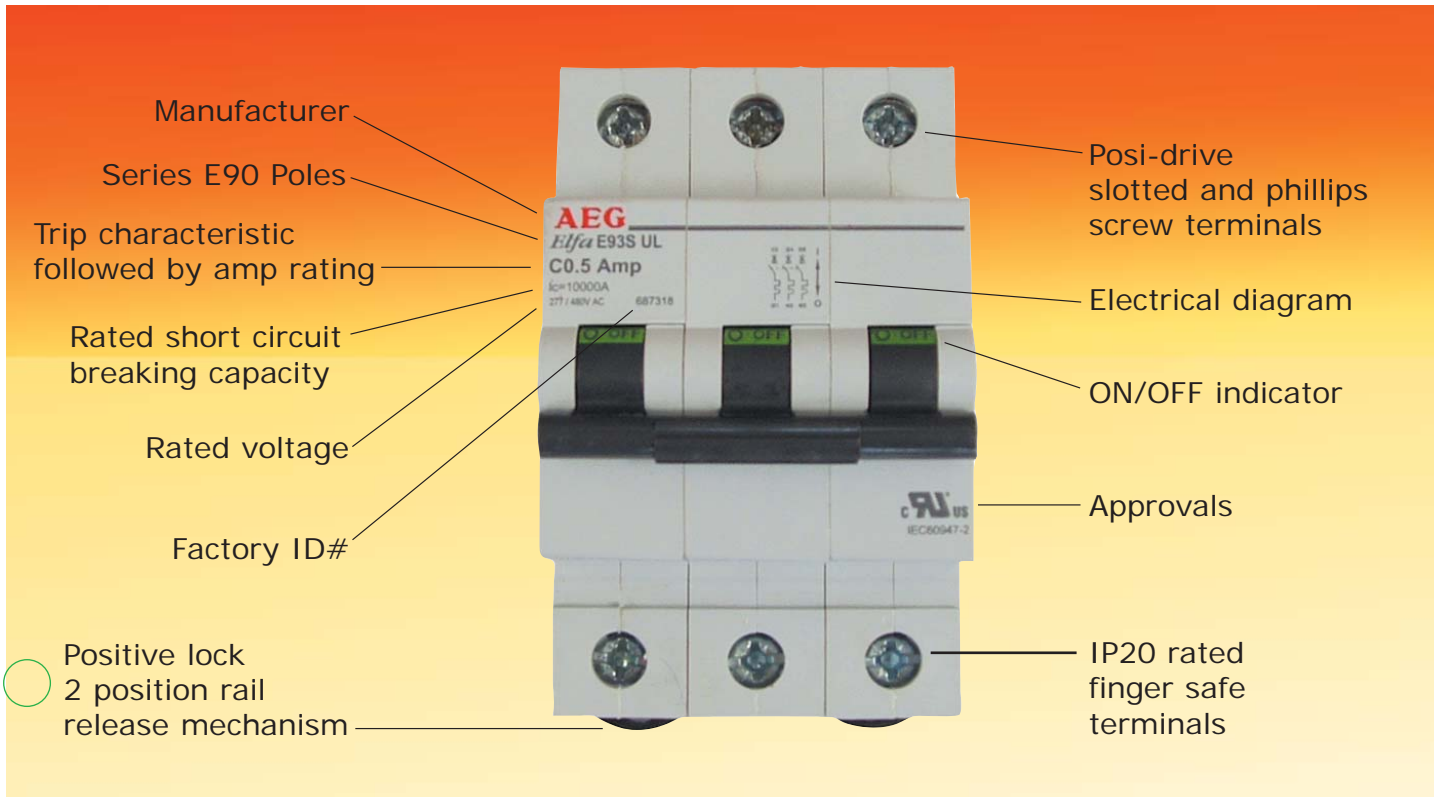
### Optional Wire Connecting

- Posi-drive, philips and slotted head screw terminals
- Pin type, fork type as well as hard wire connection ability
- Terminal torque to 4.5 Nm. (E90S-E90S-UC)

## FEATURES & BENEFITS

- cUL 1077 approved (File # E151139)
- High **10kA** interruption capacity
- Electrical ratings to **277/480 Volts (AC)**
  - (1P) 48VDC, (2P) 110VDC
- Available in **3 different trip characteristics**
  - **B** = (3-5X rated current) Magnetic Operating Limit
  - **C** = (5-10X rated current) Magnetic Operating Limit
  - **D** = (10-20X rated current) Magnetic Operating Limit
- **IP20** finger safe design terminal connections
- Posi-drive philips and slotted screw head terminals
- Compact design (18mm) wide
- Current limiting (Class 3)
- **35mm** standard mount (Din Rail)
- Reverse connection approved
- Tropicalized to **+55°C / 95% RH**

### FEATURES EXPLAINED



### ACCESSORY / MOUNTING OPTIONS



### 1. The technical design

Elfa miniature circuit breakers were designed for high-quality electrical installations featuring high capacity, reliability and protection of man and property, pointing the way for the future.

#### Your advantage

Comprehensive assortment of miniature circuit breakers for all practical applications.

### 2. The current ratings

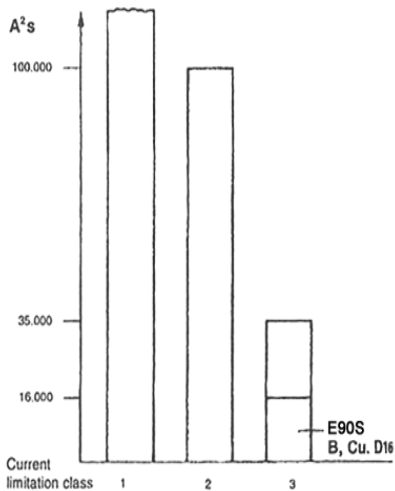
Elfa miniature circuit breakers with current ratings from 0.5 A to 125 A of uniform design protect all unusual circuits in residential and industrial buildings and switchboards.

#### Your advantage

The uniform miniature circuit breaker series is also suitable for copper conductor cross-sections to 35 mm<sup>2</sup>, (#18-2 AWG).

### 3. The switching capacity

Elfa miniature circuit breakers have a switching capacity of 10 kA (E90S) according to DIN VDE0641 or EN 60 898. In accordance with Europa Standard EN 60 898 Elfa miniature circuit breakers have a switching capacity of up to 25kA at some current ratings.

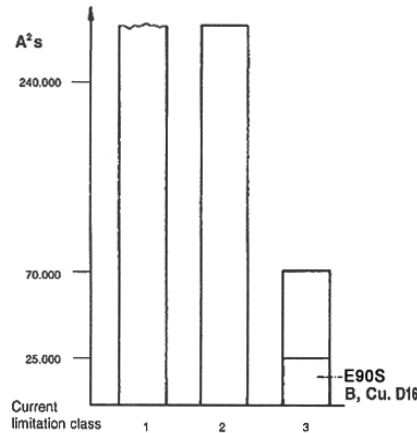


#### Your Advantage

Elfa miniature circuit breakers with international test marks also perform extreme protection duties in installation technology.

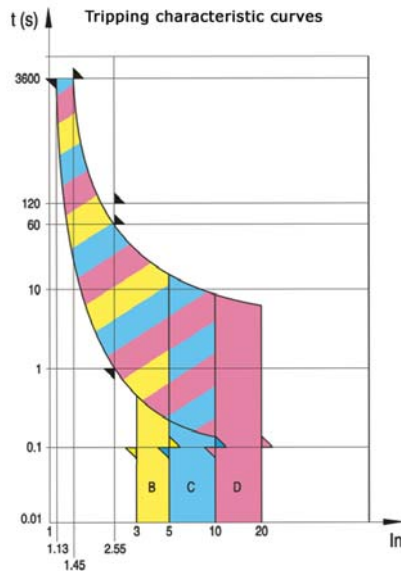
### 4. The current limitation

Elfa miniature circuit breakers in the event of a fault limit the short-circuit power to less than 50% of the values permitted by most international testing stations.



#### Your advantage

Increased protection of electrical equipment allows supplementary thermal fuses to be omitted.



### 5. The tripping characteristics

Elfa miniature circuit breakers are "Europa breakers" with the uniform tripping characteristics B, C and D standardized for the future, and the test marks of all European testing stations. B, C and D are approved per UL 1077, as supplementary protectors. (277/480 Volts max)

### Rated current and characteristic Series E90S

#### B-characteristic

According to DIN VDE 6041 A4/11.8 with rated current ranges from 6 to 63 A, according to EN 60 898 with rated current ranges from 80 to 125 A. Thermal operating limit 1.13 to 1,45 times rated current (reference ambient temperature 30°C) Magnetic operating limit 3 to 5 times rated current.

Miniature circuit breakers with B characteristic are used primarily for wiring protection in lighting, socket outlet and control circuits.

#### C-characteristic

According to DIN VDE 0641 Part 11/08.92 with rated current ranges from 0.5 to 63 A, according to EN 60 898 with rated current ranges from 80 to 125A.

Thermal operating limit 1.13 to 1.45 times rated current. (Reference ambient temperature 30°C) Magnetic operating limit 5 to 10 times rated current.

Miniature circuit breakers with C characteristic are used for overload and short-circuit protection primarily to protect equipment with high making currents (e.g. motors and transformers).

#### D-characteristics

(series E90S)

According to EN 60 898 with rated current ranges from 0.5 to 125 A.

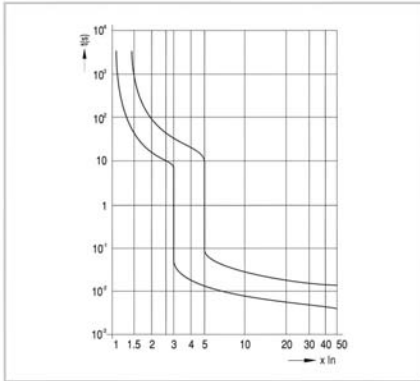
Thermal operating limit 1.13 to 1, 45 rated current (reference ambient temperature 30°C). Magnetic operating limit 10 to 20 times rated current.

Miniature circuit breakers with D characteristic ensure that even electrical equipment with very high making current, as heavy-starting motors, transformers, groups of lights, do not lead to undesired early tripping.

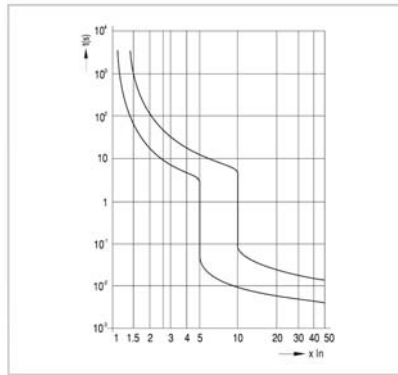


Curves Acc. EN60898 (Thermal / Magnetic Release)

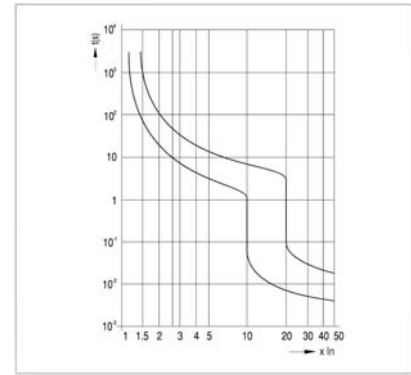
**Curve B**



**Curve C**



**Curve D**



### 6. The modular equipment program

Elfa miniature circuit breakers can be combined with residual-current trips, remote-control drives and auxiliary contacts. As variants they are also intended for direct-current systems, marine construction and railway engineering as well as for plants at increased ambient temperatures.

#### Your advantage

Using the complete delivery program widely different duties can be rationally and economically performed by compact equipment combinations. Supplementary elements can be fitted on later.

### 7. The remote-control facility

Elfa miniature circuit breakers up to 63 A current rating with remote-control drive can be switched on and off over distances by press of a button.

#### Your Advantage

Elfa miniature circuit breakers do not have to be mounted within hand reach.

### 8. The input terminal

The large-sized input box terminal permits both the connection of conductors up to 35 mm<sup>2</sup>, (#2 AWG) and simultaneous busbar connection. Elfa miniature circuit breakers of more than 63 A current rating can even clamp conductors up to 70 mm<sup>2</sup>, (#2/0 AWG).

#### Your advantage

Elfa miniature circuit breakers save supplementary terminals and reduce installation costs.



### 9. The output terminals

Elfa E90S miniature circuit breakers have an IP20 finger safe protected box terminal that has a wide range of connections. From #18-#2 awg wire, including pin and fork type buss. (35 / 2 x 16mm<sup>2</sup> max.)

#### Your Advantage

Short installation times and simple wiring of multi-strand conductors.

### 10. "Two" position snap mount

makes installing breakers a snap. Positive lock in "open" and locked position. A real plus when removing multi pole breakers.



### 11. The operating toggle

Elfa miniature circuit breakers have color coded switch position indicators. If the green marking is visible, the switch contacts are open, if the red marking is visible, the switch contacts are closed.



**O-OFF**

#### O-OFF

Contacts in open position. Ensure a distance between contacts > 4mm.



**I-ON**

#### I-ON

Contacts in closed position. Ensure continuity in the main circuit.

## APPROVALS

UL (UL 1077), CSA RATINGS  
277/480 VAC (0.5 TO 63A) @ 10KA

Approvals International Type E90 Breakers are used worldwide and meet international standards:  
CE, IEC, VDE, CEBEC, KEMA,  
BS, IMQ.

European Standard Ratings  
240/415 VAC, 6 to 110 Volt DC

UL 1077 Standard for Supplementary Equipment. UL 1077 is used for over current protection within electrical equipment, where branch circuit protection is already provided or not required.



## TECHNICAL DATA

- 0.5 Amp - 63 Amp UL
- Short circuit capacity (10kA) IC
- 35mm Din Rail mounted
- Screw torque to 4.5 N.m
- Mechanical endurance (20,000 operations)
- Electrical endurance (10,000 operations)
- Current limiting design  
(Energy limit class 3)
- Wire range - #2 AWG or 2 x #6 AWG (max.)  
#18 AWG (min.)  
(35/2 x 16 mm<sup>2</sup>) max.
- Max. AC Volts 277/480V
- Max. DC Volts (1P)48 VDC  
(2P)110 VDC
- Operating temperature  
From -25°C to +50°C according to IEC 60898
- Thermal operating limit: (1.13-1.45 x I<sub>n</sub>)
- Shock resistance (in x, y, z direction)  
20g with shock duration of 10ms  
(minimum 18 shocks)  
40g with shock duration of 5ms  
(minimum 18 shocks)
- Vibration resistance (in x, y, z direction)  
3g in frequency range 10 to 55Hz  
(operating time at least 30 minutes)  
according to IEC 77 16.3 and DIN 40046 part 8
- Storage temperature  
From -55°C up to +55°C  
according to IEC 88 part 2-1
- Tropicalized to +55°C /95% RH  
(Acc. IEC 60068-2 / DIN 40046)

## STANDARDS / APPROVALS

- UL 1077/CSA (File#E151139)
- CE
- IEC 60898 / 60947-2
- CEBEC
- VDE
- KEMA
- BS4293
- IMQ

## TECHNICAL PERFORMANCE

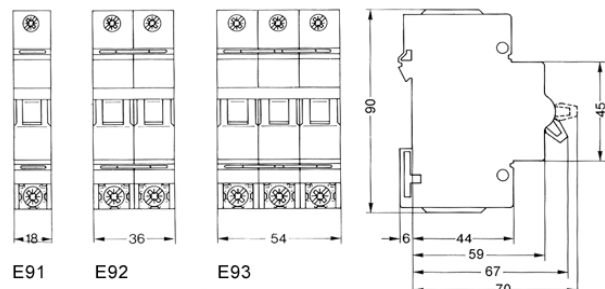
- 3 optional trip characteristics
  - B = 3-5x magnetic release
  - C = 5-10x magnetic release
  - D = 10-20x magnetic release

	Test current	Tripping time	Application
<b>B</b>	3 I <sub>n</sub> 5 I <sub>n</sub>	t ≥ 0.1s t < 0.1s	Only for resistive loads such as: - electrical heating - water heater - stoves
<b>C</b>	5 I <sub>n</sub> 10 I <sub>n</sub>	t ≥ 0.1s t < 0.1s	Usual loads such as: - lighting - socket outlets - small motors
<b>D</b>	10 I <sub>n</sub> 20 I <sub>n</sub>	t > 0.1s t < 0.1s	Control and protection of circuits having important transient inrush currents (large motors)

## DIMENSIONAL DATA

Dimensions Approx. mm(inch)

**E91S, E92S, E93S - 0.5A to 63A (B,C Trip)**



"B" TRIP (3-5 X In)			"C" TRIP (5-10 X In)			"D" TRIP (10-20 X In)		
Amps	Part#	List	Amps	Part#	List	Amps	Part#	List
			0,5	E91SULC0,5	\$40	0,5	E91SULD0,5	\$45
			1	E91SULC01	\$40	1	E91SULD01	\$45
			2	E91SULC02	\$40	2	E91SULD02	\$45
			3	E91SULC03	\$40	3	E91SULD03	\$45
			4	E91SULC04	\$40	4	E91SULD04	\$45
5	E91SULB05	\$40	5	E91SULC05	\$40	5	E91SULD05	\$45
6	E91SULB06	\$40	6	E91SULC06	\$40	6	E91SULD06	\$45
10	E91SULB10	\$40	10	E91SULC10	\$40	10	E91SULD10	\$45
13	E91SULB13	\$40	13	E91SULC13	\$40	13	E91SULD13	\$45
15	E91SULB15	\$40	15	E91SULC15	\$40	15	E91SULD15	\$45
16	E91SULB16	\$40	16	E91SULC16	\$40	16	E91SULD16	\$45
20	E91SULB20	\$40	20	E91SULC20	\$40	20	E91SULD20	\$45
25	E91SULB25	\$42	25	E91SULC25	\$42	25	E91SULD25	\$47
30	E91SULB30	\$44	30	E91SULC30	\$44	30	E91SULD30	\$49
32	E91SULB32	\$44	32	E91SULC32	\$44	32	E91SULD32	\$49
40	E91SULB40	\$48	40	E91SULC40	\$48	40	E91SULD40	\$53
50	E91SULB50	\$52	50	E91SULC50	\$52	50	E91SULD50	\$57
60	E91SULB60	\$68	60	E91SULC60	\$68	60	E91SULD60	\$73
63	E91SULB63	\$68	63	E91SULC63	\$68	63	E91SULD63	\$73
			0,5	E92SULC0,5	\$84	0,5	E92SULD0,5	\$94
			1	E92SULC01	\$84	1	E92SULD01	\$94
			2	E92SULC02	\$84	2	E92SULD02	\$94
			3	E92SULC03	\$84	3	E92SULD03	\$94
			4	E92SULC04	\$84	4	E92SULD04	\$94
5	E92SULB05	\$84	5	E92SULC05	\$84	5	E92SULD05	\$94
6	E92SULB06	\$84	6	E92SULC06	\$84	6	E92SULD06	\$94
10	E92SULB10	\$84	10	E92SULC10	\$84	10	E92SULD10	\$94
13	E92SULB13	\$84	13	E92SULC13	\$84	13	E92SULD13	\$94
15	E92SULB15	\$84	15	E92SULC15	\$84	15	E92SULD15	\$94
16	E92SULB16	\$84	16	E92SULC16	\$84	16	E92SULD16	\$94
20	E92SULB20	\$84	20	E92SULC20	\$84	20	E92SULD20	\$94
25	E92SULB25	\$90	25	E92SULC25	\$90	25	E92SULD25	\$100
30	E92SULB30	\$94	30	E92SULC30	\$94	30	E92SULD30	\$104
32	E92SULB32	\$94	32	E92SULC32	\$94	32	E92SULD32	\$104
40	E92SULB40	\$102	40	E92SULC40	\$102	40	E92SULD40	\$112
50	E92SULB50	\$110	50	E92SULC50	\$110	50	E92SULD50	\$120
60	E92SULB60	\$124	60	E92SULC60	\$124	60	E92SULD60	\$134
63	E92SULB63	\$124	63	E92SULC63	\$124	63	E92SULD63	\$134
			0,5	E93SULC0,5	\$146	0,5	E93SULD0,5	\$161
			1	E93SULC01	\$146	1	E93SULD01	\$161
			2	E93SULC02	\$146	2	E93SULD02	\$161
			3	E93SULC03	\$146	3	E93SULD03	\$161
			4	E93SULC04	\$146	4	E93SULD04	\$161
5	E93SULB05	\$146	5	E93SULC05	\$146	5	E93SULD05	\$161
6	E93SULB06	\$146	6	E93SULC06	\$146	6	E93SULD06	\$161
10	E93SULB10	\$146	10	E93SULC10	\$146	10	E93SULD10	\$161
13	E93SULB13	\$146	13	E93SULC13	\$146	13	E93SULD13	\$161
15	E93SULB15	\$146	15	E93SULC15	\$146	15	E93SULD15	\$161
16	E93SULB16	\$146	16	E93SULC16	\$146	16	E93SULD16	\$161
20	E93SULB20	\$146	20	E93SULC20	\$146	20	E93SULD20	\$161
25	E93SULB25	\$154	25	E93SULC25	\$154	25	E93SULD25	\$169
30	E93SULB30	\$162	30	E93SULC30	\$162	30	E93SULD30	\$177
32	E93SULB32	\$162	32	E93SULC32	\$162	32	E93SULD32	\$177
40	E93SULB40	\$162	40	E93SULC40	\$162	40	E93SULD40	\$177
50	E93SULB50	\$182	50	E93SULC50	\$182	50	E93SULD50	\$197
60	E93SULB60	\$204	60	E93SULC60	\$204	60	E93SULD60	\$219
63	E93SULB63	\$204	63	E93SULC63	\$204	63	E93SULD63	\$219



1 Pole



2 Poles



3 Poles

(80A - 125A)



## STANDARDS / APPROVALS

- EN60947-2
- VDE
- CE

## TECHNICAL DATA

- 80 Amp - 125 Amp Rated (80-120 Amp Non-UL)
- Short circuit capacity (10kA) IC
- 35mm Din Rail mounted
- Screw torque to 5 Nm.
- Mechanical endurance (10,000 operations)
- Electrical endurance (4,000 operations)
- Current limiting design  
(Energy limit class 3)
- Max. AC Volts 277/480V
- Max. DC Volts (1P)48 VDC  
(2P)110 VDC
- Operating temperature  
From -25°C to +50°C according to IEC 60898
- Thermal operating limit: (1.13-1.45 x I<sub>n</sub>)
- Storage temperature  
From -55°C up to +55°C  
according to IEC 88 part 2-1
- Use at 400Hz  
At 400Hz the magnetic tripping current is  
approximately 50% higher than at AC 50/60Hz

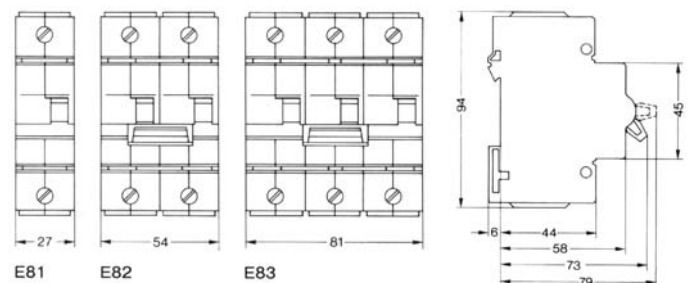
## TECHNICAL PERFORMANCE

- 3 optional trip characteristics
  - B = 3-5 x magnetic release
  - C = 5-10 x magnetic release
  - D = 10-20 x magnetic release

	Test current	Tripping time	Application
<b>B</b>	3 I <sub>n</sub> 5 I <sub>n</sub>	t ≥ 0.1s t < 0.1s	Only for resistive loads such as: - electrical heating - water heater - stoves
<b>C</b>	5 I <sub>n</sub> 10 I <sub>n</sub>	t ≥ 0.1s t < 0.1s	Usual loads such as: - lighting - socket outlets - small motors
<b>D</b>	10 I <sub>n</sub> 20 I <sub>n</sub>	t > 0.1s t < 0.1s	Control and protection of circuits having important transient inrush currents (large motors)

## DIMENSIONAL DATA

Dimensions Approx.. mm(inch)  
E881S, E882S - 80A to 125A





**(80A - 120A)**

"B" TRIP (3-5 X In)			"C" TRIP (5-10 X In)			"D" TRIP (10-20 X In)		
Amps	Part#	List	Amps	Part#	List	Amps	Part#	List
80	E881S B080	\$128	80	E881S C080	\$128	80	E881S D080	\$134
100	E881S B100	\$135	100	E881S C100	\$135	100	E881S D100	\$141
125	E881S B125	\$181	125	E881S C125	\$181	125	E881S D125	\$187
80	E882S B080	\$333	80	E882S C080	\$333	80	E882S D080	\$345
100	E882S B100	\$352	100	E882S C100	\$352	100	E882S D100	\$364
125	E882S B125	\$472	125	E882S C125	\$472	125	E882S D125	\$483
80	E883S B080	\$499	80	E883S C080	\$499	80	E883S D080	\$517
100	E883S B100	\$533	100	E883S C100	\$533	100	E883S D100	\$550
125	E883S B125	\$707	125	E883S C125	\$707	125	E883S D125	\$725



**1 Pole**



**2 Poles**



**3 Poles**

**Questions & Answers**

**Q:** Where can I use AEG's (UL1077) approved mini breakers?

**A:** Practically anywhere supplemental protection is required. Motor loads, transformers, heating resistive loads, control circuits.

**Q:** Is there any minimum distance between circuit breakers?

**A:** You can mount AEG mini breakers side by side with each other. There is a recommendation of approx.. 35mm (1.4") when mounting breakers above each other in a parallel plane.

**Q:** Do I need any additional upstream protection?

**A:** Local codes vary, however typically upstream protection is already provided via the primary plant & distribution panel (UL489 approved breaker).

**Q:** If I need a UL489 breaker for my application, can you supply?

**A:** Refer to pages 143-147 for a full line series of UL489 breakers from (15 Amps - 600 Amps).