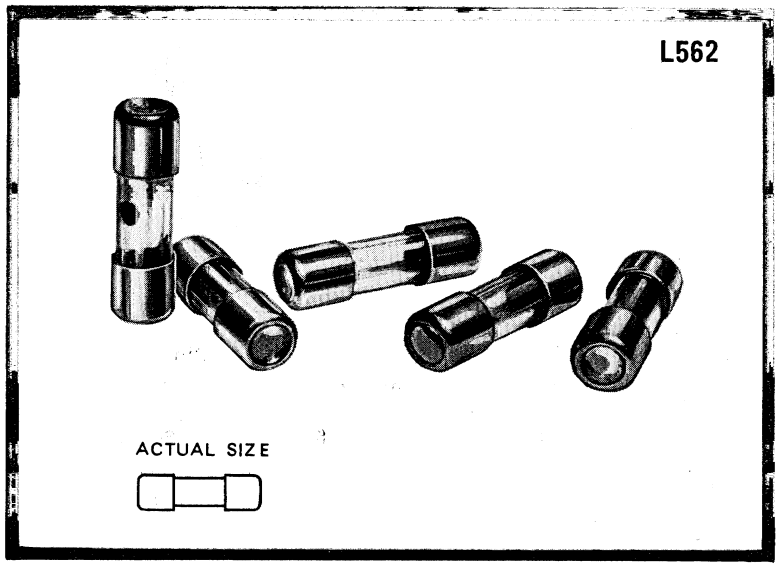
Light Duty Fuse Links
size 00

L562 Miniature, Glass, 5/8" x 3/16" (15,9 x 4,76mm) diameter

This range of miniature fuse links was developed originally for Services' use, but has many applications in instrumentation, electronic data processing machines, printed circuitry, and all miniaturised equipment.

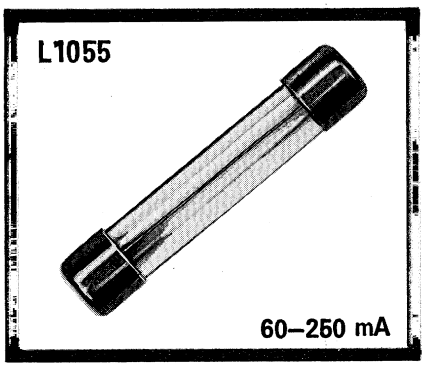


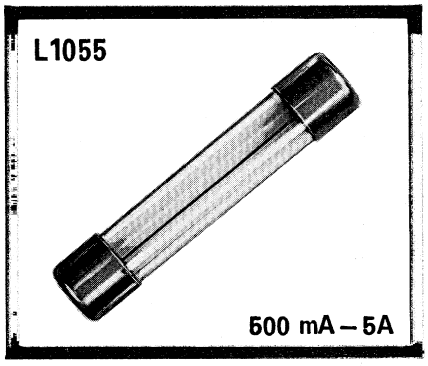
These fuse links have a minimum life of 1,000 hours at rated current, at 20°C
The higher ratings (250 mA and over) blow within 10 seconds at twice their rated current, lower ratings at 3 x Ir.

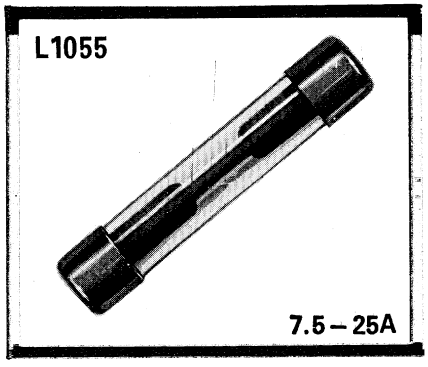
CONTINUOUS RATING (1000 Hours)	RATED VOLTAGE d.c.	COLOUR CODE
50mA	900V	Salmon Pink
100mA	900V	Dark Grey
150mA	600V	Red
250mA	600V	Dark Brown
350mA	360V	
500mA	360V	Yellow
1A	300V	Azure Blue
2·5A	150V	Yellow & Purple-brown
4A	150V	
7·0A	120V	Orange

Marking:	Rated value on cap, and colour coded body
Weight (average):	0·61g (0·02 oz)
Belling-Lee reference nos.:	L562/current rating in amp. Example: L562/050 is a 50mA fuse link
Fuseholders: (Subject to their individual ratings)	L575 panel mounting L1383 for printed circuits L1596 panel mounting

Light Duty Fuse Links
size 0







L 1055 Standard, Glass
1¼" x ¼"(31,8 x 6,35mm) diameter

These fuse links have a minimum life of 1,000 hours at rated current at 20°C, and blow within 10 seconds at 2 x Ir.

De-rating factor for operation at elevated temperatures:
1·75% per 10°C up to 100°C

Markings:
Rated value on cap
(colour coded body if required)

Weight (average):
1,98g (0·07 oz)

Belling-Lee reference nos.:
L1055/current rating
Example: L1055/060 is a 60mA fuse link.

Continuous Rating 1000 Hours	RATED VOLTAGE To BS 2950/A d.c.	a.c.	COLOUR CODE (If Required)
60mA	1000	1000	Black
100mA	1000	1000	Dark Grey
150mA	1000	1000	Red
250mA	750	1000	Dark Brown
500mA	350	750	Yellow
750mA	300	500	Green
1A	250	350	Azure Blue
1·5A	250	250	Sky Blue
2A	250	250	Dark Violet
3A	32	250	White
5A	32	250	Black & White
7·5A	32	100	Orange
10A	32	100	Light Orange & Black
12A	32	100	Lt. Orange & Dk. Grey
15A	32	50	Light Orange & Green
20A	32	32	Lt. Orange & Dk. Violet
25A	32	32	Lt. Orange & White

Fuseholders (Subject to their individual ratings):

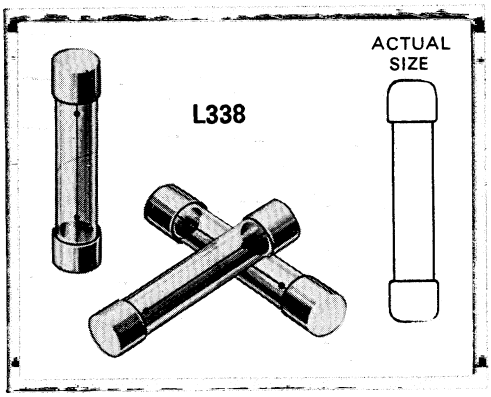
L 510 single, open
*L 670 single, closed, sealed
L 1045/C3 single, closed
L 1341 panel, bayonet cap
*L 1348 panel
*L 1382 panel, sealed
L 1744 panel, bayonet cap
L 1745 single, in-line
L 1848 panel, indicating
*L 672 twin, closed, sealed
L 676 twin, indicating, sealed
L 1033/C4 twin, closed
L 1291 twin, semi-recessed

(* Qualification approved)

L 338 'MAG-NICKEL', delay
1¼" x ¼" (31,8 x 6,35mm) diameter

This range withstands surges of up to 15 times the rated current for a period not exceeding 0·01 second, and without shortening of normal life through embrittlement. Suitable fuseholders as for L 1055.

Current ratings:	250mA, 500mA, 750mA
Life:	⩽ 1,000 hours at rated current, at 20°C
Markings:	Rated value on caps, colour coded body
Weight (average):	1,41g (0·05 oz)
Belling-Lee reference nos.:	L338/L250, L338/500, L338/750



Light & Heavy Duty Fuse Links

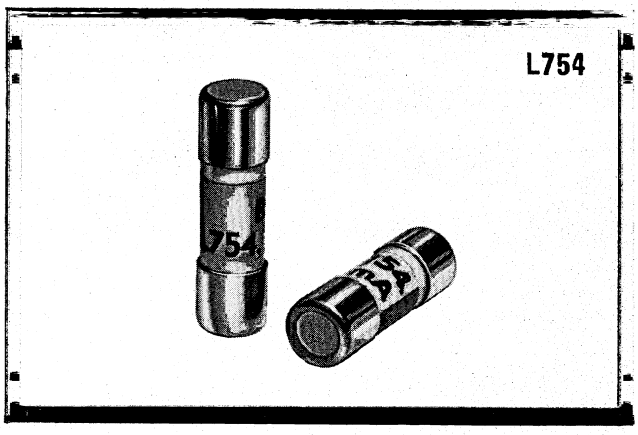
size 00 & 20mm x 5mm

L754 Miniature, Ceramic
5/8" x 3/16" (15,9 x 4,76 mm) diameter

These fuse links range from 50mA to 2A and have a category of duty 250V AC2, 230V DC2 (max. prospective overload 4000A at 0·4 pf and 250V a.c.), and so may be described as high-rupturing capacity fuse links. They have a minimum life of 1000 hours at rated current at temperatures up to 25°C and at 80% of their rated current at temperatures beyond this up to 100°C. Temperature range: –60° to +100°C. Humidity classification, D.T.D. 1085–C.

Specification:	DEF.63
Marking:	Body colour coded and marked with rating
Weight (average):	0,85 g (0 03 oz)
Belling-Lee reference nos.:	L754/current rating. Example L754/050 is a 50mA fuse link.
Fuseholders:	*L575 panel mounting *L675 sealed, panel mounting L1383 for printed circuit mounting L1596 panel mounting *Qualification Approved

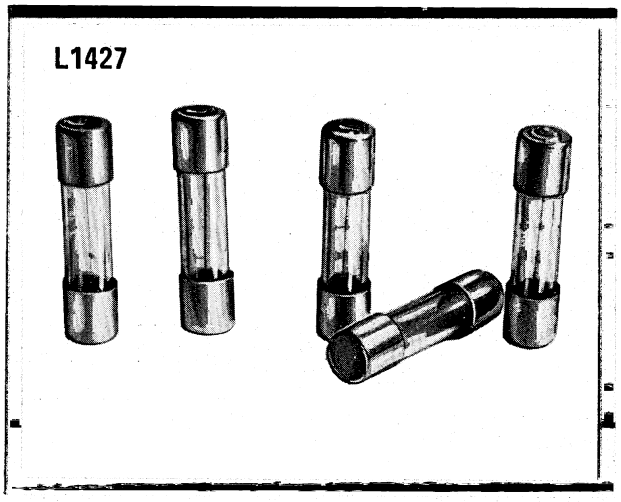
Note: The L754 range of fuse links has been extended downwards for instrument protection and other light duty applications, by the addition of 10, 15 and 25 mA ratings.



CONTINUOUS RATING 1000 HOURS		
NOMINAL @ 25°C	SERVICE @ 100°C	COLOUR CODE
50mA	40mA	Pink
100mA	80mA	Grey
*250mA	200mA	Brown
*500mA	400mA	Yellow
*1A	0·8A	Dark Blue
*2A	1·6A	Dark Violet

* Qualification Approved

COLOUR CODE 10 mA, green and yellow
15 mA, red and light blue
25 mA, Eau-de-Nil



Fuseholders:
E6011 – miniature panel mounting
L1426 – for printed circuit mounting

L1427 International, glass, 20 x 5 mm diameter

A range of quick-acting, cartridge fuse links for the protection of appliances or parts of appliances for use at a maximum ambient temperature of 35°C, a maximum relative humidity of 75% and a minimum air pressure of 860 mbar.

The blowing characteristics (pre-arcing times) are in accordance with I.E.C.127, Standard Sheet II requirements.

Current Ratings:
1 – 1,25 – 1,6 – 2A, 2,5 – 3,15 – 4A — Rated voltage 250V a.c.
5 – 6,3A — Rated voltage 150V a.c.

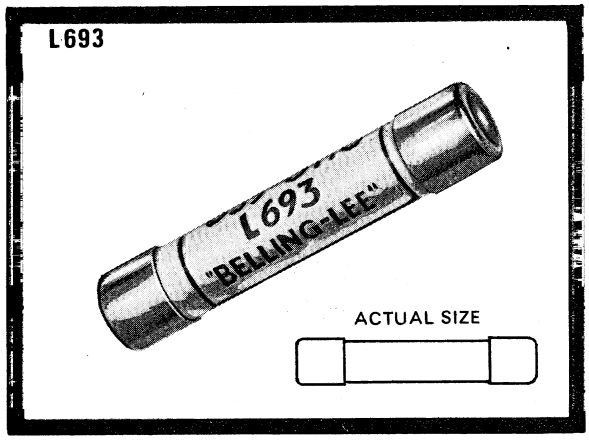
Breaking Capacity:
35A a.c. or 10 x Ir (whichever is greater at 0 8 power facter.

Marking:
Current and voltage rating on cap.

Belling-Lee reference nos.:
L1427/current rating in amp.
Example: L1427/1 is a 1A fuse link.

Heavy Duty Fuse Links

size 0



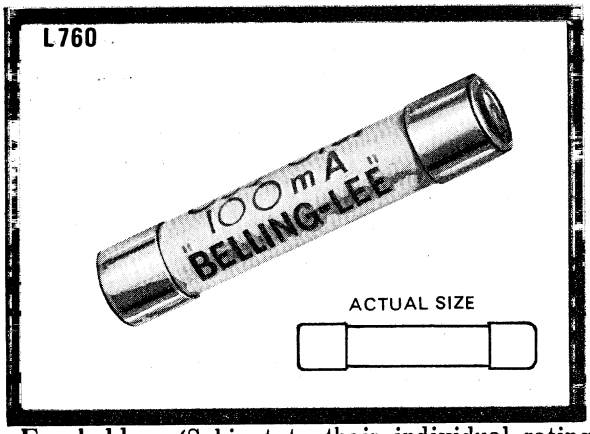
CONTINUOUS RATING ·1000 HOURS		COLOUR CODE
Nominal @ 25°C	Services @ 100°C	
250mA·	200mA	Brown
500mA	400mA	Yellow
1A	800mA	Azure Blue
2A	1·6A	Violet
3A	2·4A	White
5A	4·0A	Black & White
7A	5·6A	Orange
10A	8·0A	Black & Orange

Standard Ceramic, 1¼" x ¼" (31,8 x 6,35mm) diameter

Approved by Joint Services, ARB, Central Electricity Generating Board, and Lloyd's Register of Shipping.

These fuse links have a category of duty 440V AC4, 230V DC4 (max. prospective overload 33,000A at 0.3 pf and 440V a.c.). They have a minimum life of 1,000 hours at rated current at temperatures up to 25°C and at 80% of their rated current at temperatures beyond this up to 100°C. Temperature range, –60° to +100°C. Humidity classification, D.T.D. 1085–C.

Specification:
DEF.63
Marking:
Rated value, on cap; body colour coded and marked with rating, and Joint Service Catalogue number.
Weight (average):
2,6 g (0·09 oz)
Belling-Lee reference nos.:
L693/rating. Example: L693/250 is a 250mA fuse link.
For suitable fuseholders, see below.



In these fuse links, which extend the range of heavy duty fuse links down to 60mA, the ceramic bodies are not filled with silica since this is unnecessary on account of the smaller material content and rating of the elements.
Category of duty, 250V AC2, 230V DC2 (max. prospective overload 4,000A at 0.4 pf and 250V a.c.).

Specification:	DEF.63
Current Ratings & Colours:	60mA (black), 100mA (dark grey), 150mA (red).
Blowing Time:	Within 10 seconds at 2 x Ir
Life:	As L693 series (above)
Weight (average):	2,2 g (0·07 oz)

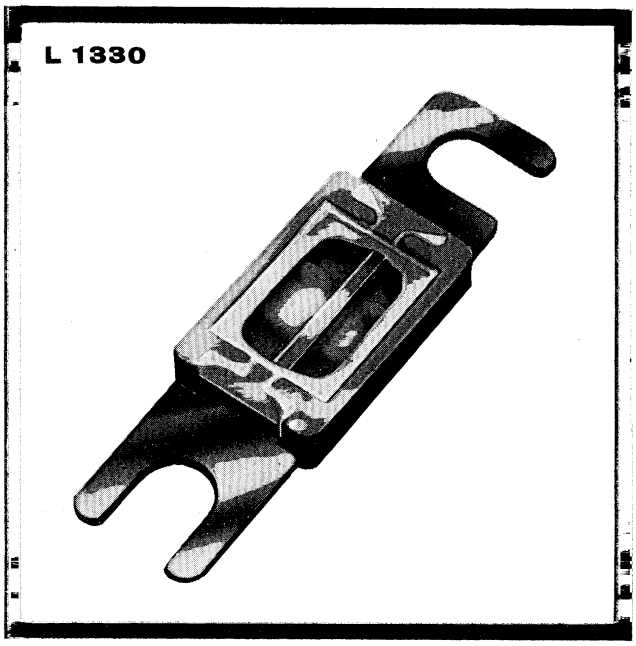
Fuseholders (Subject to their individual ratings):–

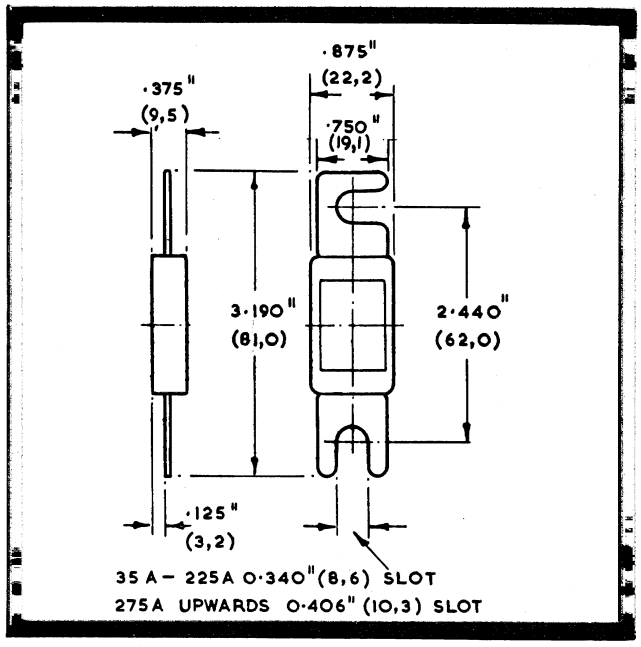
L 510	single, open	L 1745	single, in-line
*L 670	single, closed, sealed	L 1848	panel, indicating
L 1045/C3	single, closed	*L 672	twin, closed, sealed
L 1341	panel, bayonet cap	L 676	twin, indicating, sealed
*L 1348	panel	L 1033/C4	twin, closed
*L 1382	panel, sealed	L 1291	twin, semi-recessed
L 1744	panel, bayonet cap		

(* Qualification approved)

Belling-Lee reference nos.: L760/rating in Amp. Example: L760/060 is a 60mA fuse link.

Heavy Duty 'Air-Fuse'





DIMENSIONS: Cut-outs minima, normal tolerance +0 005".
Overall sizes and fixing centres nominal.
Figures in brackets are approx. mm equivalents.

L 1330 "Airfuse"

The "Airfuse" is the British equivalent of the Burndy "Current Limiter" used in 28 V.d.c. aircraft power supply circuits. Needing no holder, the "Airfuse" commends itself to the aircraft industry by its saving in weight, and has Air Registration Board Approval. It has numerous other applications, such as the protection of battery driven vehicles, heavy current rectifiers, and low voltage furnaces, etcetera.

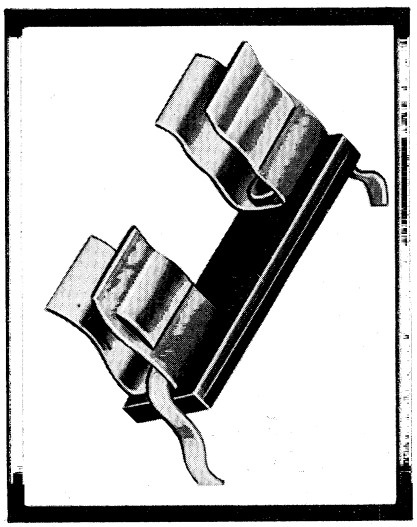
The "Airfuse" is an unfilled fuse link in a ceramic housing, with a transparent window for inspection. Heavy duty terminal lugs are fitted. There are eleven standard ratings from 35A to 500A.

Specification:	B.S. G176, parts 1 and 4
Current Ratings: (In Amps):	35, 50, 80, 100, 130, 150, 200, 225, 275, 325, 500A
Max. Prospective Overload:	35A-2,500A, remainder 3,000A, at 30V d.c.
Life:	>1,000 hours at rated current, at 20°C
Temperature Range:	–65° to +70°C
Humidity	Class H_1
Altitude:	60,000ft (18000m)
Acceleration:	B.S. G100, grade 3 Class A
Vibration:	B.S. G100, for grade 2 and 3 equipment
Materials:	Body, ceramic. Window, glass, Element, tinned Copper.
Weight (average):	18,7–29,8g (0.66–1.05 oz) according to rating
Marking:	Rating printed on the window, and stamped on lug.

Belling-Lee reference nos.: L1330/Current rating. Example: L1330/30

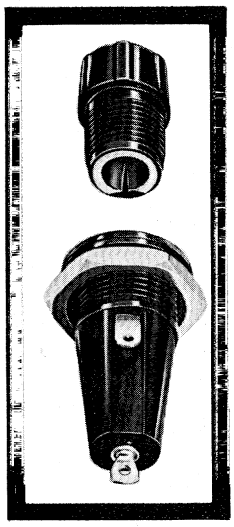
Fuseholders

size 00

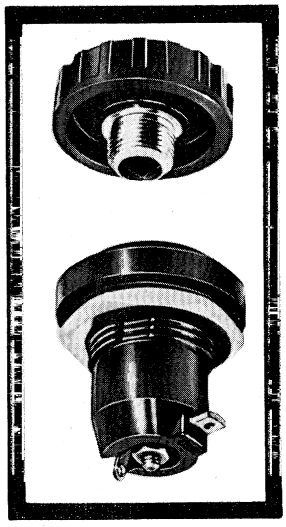


L1383 Fuseholder, open, for printed circuits 0·1" module

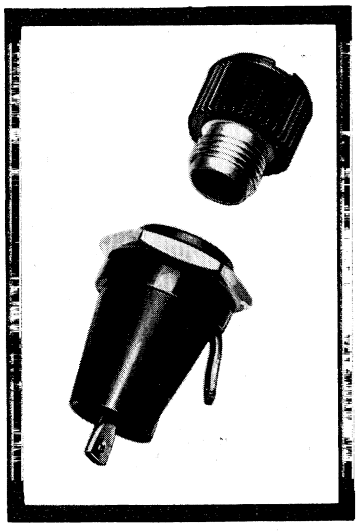
L1426 Similar type, for 20×5mm fuse links



L1596 Fuseholder, panel, E6011 Similar type for 20×5mm fuse links



L675 Fuseholder, panel, sealed Qualification approved

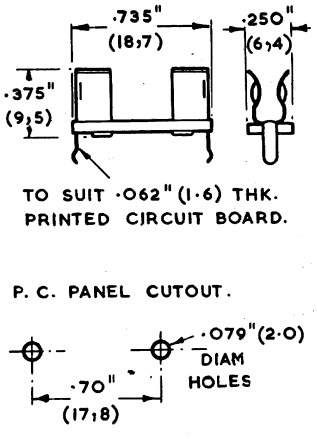


L575 Fuseholder, panel, Qualification approved.

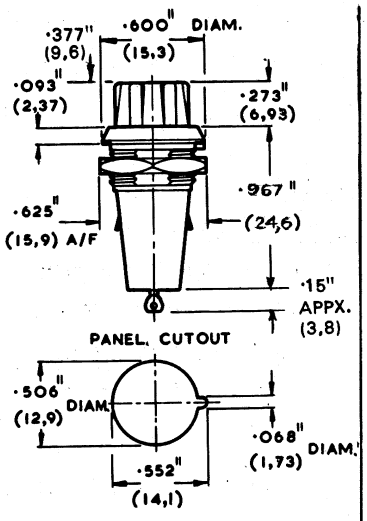
	L1383	L1596	L675	L575
Specification:	–	–	DEF.64	RCS 262 Iss.2
Current Rating:	2A *	7A *	2A*	2·5A Temp. rise <55°C
Breakdown Voltage (d.c.):	at sea level >3kV	sea level 60,000 ft (18000m) >4kV 1kV	sea level 60,000 ft (18000m) >9kV 1kV	sea level 60,000 ft (18000m) >3.5kV >1kV
Insulation Resistance:	3 x 10^6 megohms	30 x 10^3 megohms	>100 megohms	>10^2 megohms
Insertion Resistance:	<4 milliohms	<10 milliohms	<30 milliohms	<5 milliohms
Humidity:	Dry conditions only	H_5 (DEF.5011)	H_5	Class H_2
Temperature Range:	90°C max.	–55°C to +70°C	–55°C to +70°C	–40°C to +70°C
Panel Thickness (max.):	0·063in (1,6mm)	9/64 in (3,57mm)	0·15in (3,8mm)	0·064in (1,6mm)
Fixing Torque (max.):	–	1,36 Nm (12 lbf-in)	0,62 Nm (5·5 lbf-in)	0,32 Nm (2·8 lbf-in)
Weight (average):	0·03 oz (0,9g)	0·17 oz (4,75g)	0·48 oz (13,7g)	0·19 oz (5,3g)

* Temperature rise ⊁ 40°C

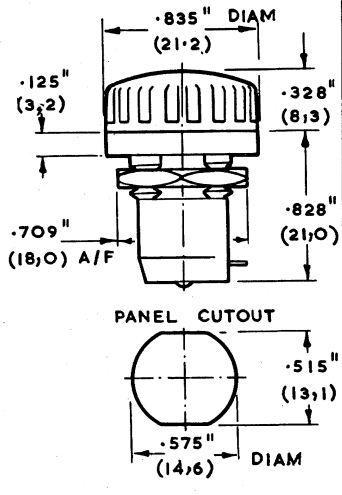
DIMENSIONS: Cut-outs minima, normal tolerance +0 005". Overall sizes and fixing centres nominal. Figures in brackets are approx. mm equivalents.



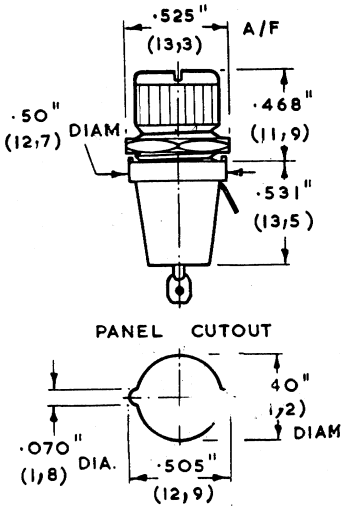
L1383



L1596

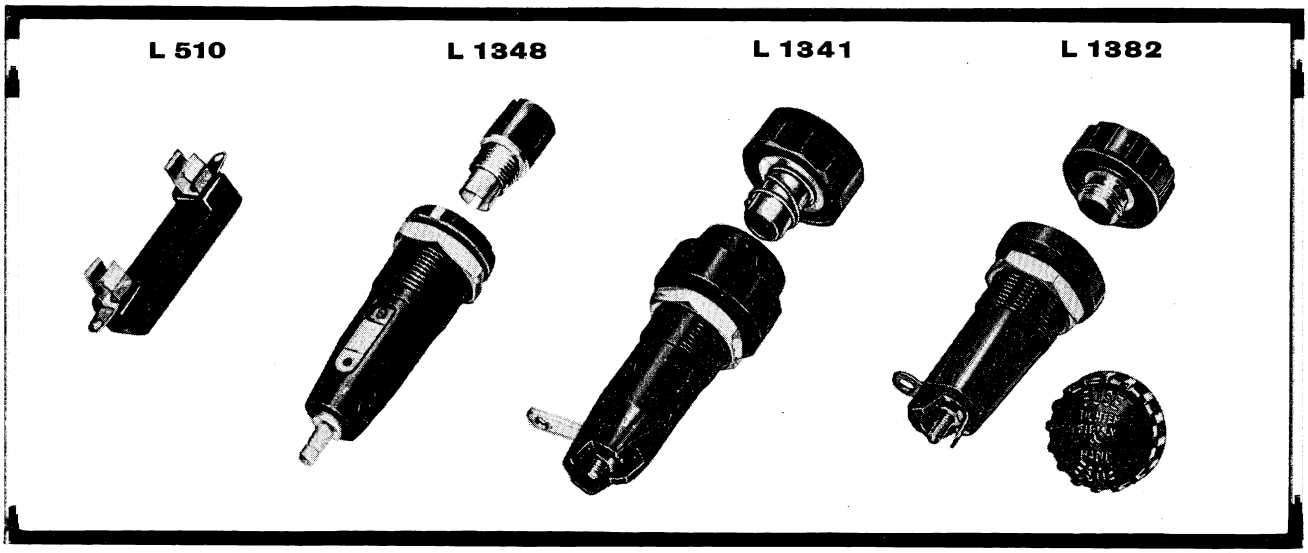


L675



L575

Fuseholders
size 0



L510 Fuseholder, open, single-pole

L1348 Fuseholder, panel
Qualification approved

L1341 Fuseholder, panel, bayonet-locking

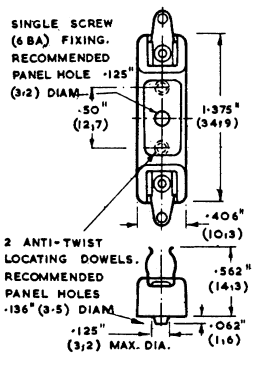
L1341/H with test-prod aperture, 0·051 in (1,3mm) diam.

L1382 Fuseholder, panel, sealed
Qualification approved

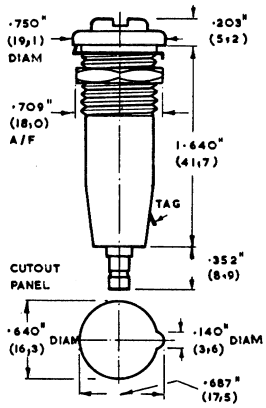
L1382/H with test-prod aperture, 0·094 in (2,4mm) diam.

	L510	L1348	L1341	L1382
Specification:	–	RCS 262. Issue 2	–	DEF.64
Current Rating:*	7A	7A	15A	7A
Breakdown Voltage (d.c.):	>10kV	>9kV	>9kV	>10kV
Insulation Resistance:	$>10^3$ megohms	>100 megohms	$>10\times10^3$ megohms	>100 megohms
Insertion Resistance:	<10 milliohms	<5 milliohms	<5 milliohms	<15 milliohms
Humidity:	H_2 (RCS.11)	H_2 (RCS.11)	H_2 (RCS.11)	H_5 (DEF.5011)
Temperature Range:	–40°C to +70°C	–40°C to +100°C	–40°C to +100°C	–55°C to +70°C
Panel Thickness (max.):	–	0·4 in (10mm)	0·312 in (7,92mm)	0·312 in (7,92mm)
Fixing Torque:	–	0,57 Nm (5lbf-in)	2,71 Nm (24 lbf-in)	1,70 Nm (15 lbf-in)
Weight (average):	0·13 oz (3,71g)	0·7 oz (19,7g)	1·27 oz (36g)	0·84 oz (23,4g)

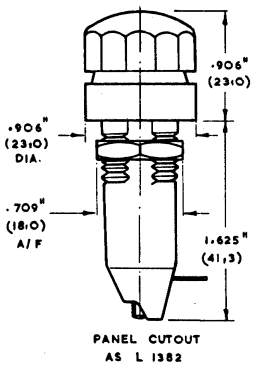
* Temperature rise ⩽40°C



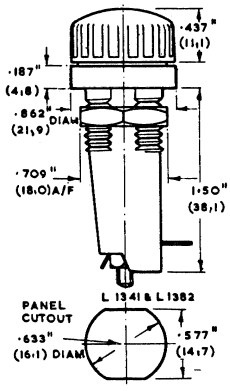
L510



L1348



L1341



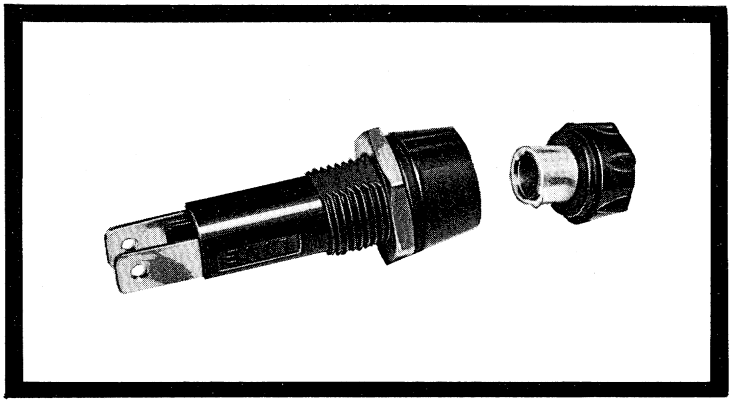
L1382

DIMENSIONS: Cut-outs minima, normal tolerance +0·005".
Overall sizes and fixing centres nominal.
Figures in brackets are approx. mm equivalents.

Fuseholder size 0

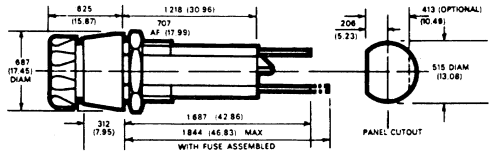
L 1744 FUSEHOLDER, PANEL, BAYONET LOCKING

A panel mounting fuseholder for 1¼" ¼" (32 x 6,3mm) fuse links fitting a 0.515" diameter panel piercing. It has a bayonet locking cap and connection posts suitable for soldering or for ¼" (6,3mm) solderless snap-on connectors. A special insulation barrier is incorporated to provide superior internal breakdown performance.



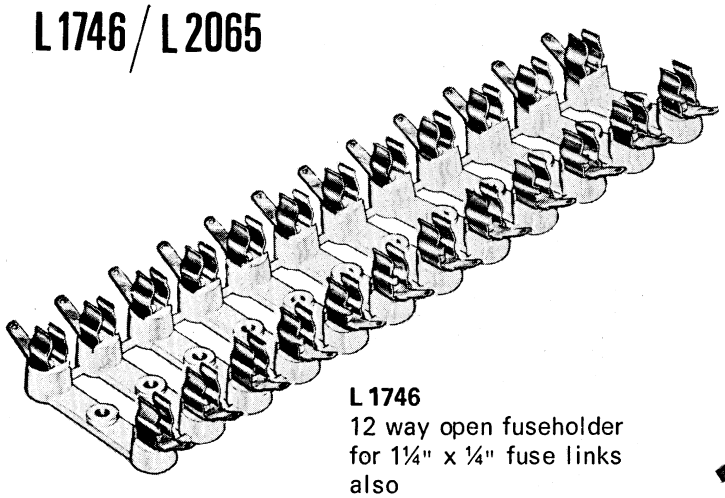
Current Rating:	30A max. (see de-rating table above)
Breakdown Voltage:	>4kV between terminations >10kV terminations to panel
Insulation Resistance:	>10 x 10^3 megohms
Insertion Resistance:	<2 milli-ohms
Humidity:	H5 (DEF.5011)
Temperature Range:	–55° to +100°C
Panel Thickness (max.):	0·313 in (7,9mm)
Fixing Torque (max.):	1,13 Nm (10lbf-in)
Moulding:	Phenolic
Contacts:	Brass, silver-plated
Weight (average):	13,7g (4 48 oz)

Current/temperature derating	
Current (amp)	Max. ambient temp. (°C)
5	90
10	75
15	65
20	50
25	40
30	30



AVAILABLE SHORTLY

L 1746 / L 2065

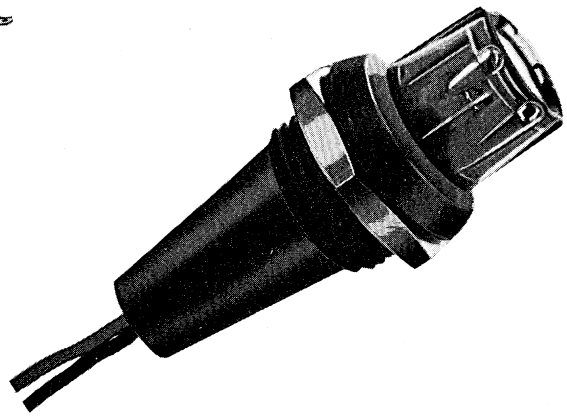


L 1746
12 way open fuseholder for 1¼" x ¼" fuse links also

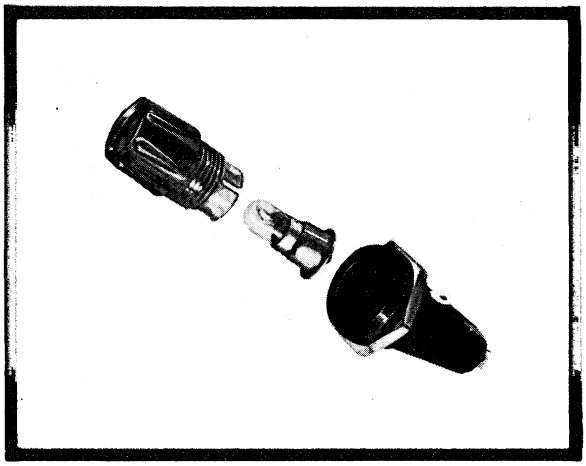
L 2005
12 way open fuseholder for 20 x 5 mm fuse links.

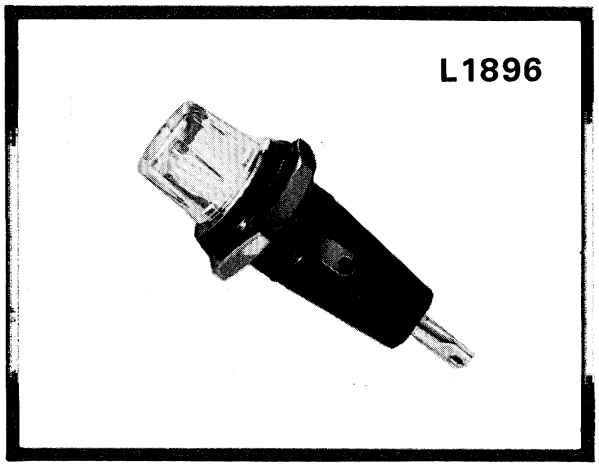
NEON INDICATOR

L 1897



LAMPHOLDER



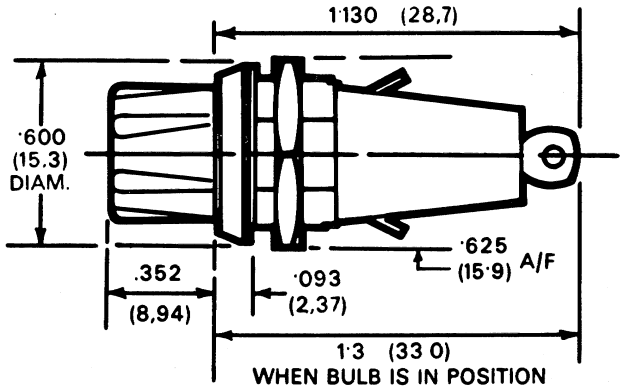


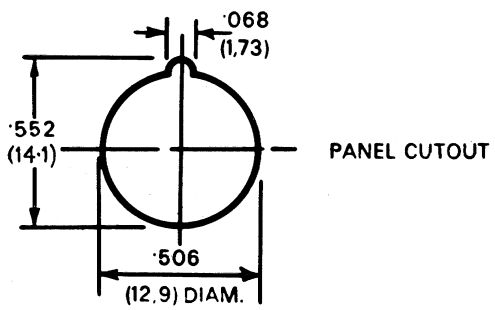
L1896 MINIATURE PANEL LAMPHOLDER

This miniature panel lampholder has been designed to match the styling of our existing range of fuse-holders L1596 for ⅝" x 3/16" and E6011 for 20 x 5 mm fuse links; having the same panel cutout and a single fixing nut. The addition of a locating spigot on the underside of its rim prevents rotation on the panel.

By unscrewing the lense, the bulb withdraws from the front of the panel, which makes the task of replacing the bulb very much simpler. The lenses are moulded in polycarbonate and are available in amber, blue, clear, green and red, while the body is a phenolic moulding.

The L1896 lampholder utilizes the L.E.S. pea-lamps, giving a range of voltage ratings and filament life requirements.

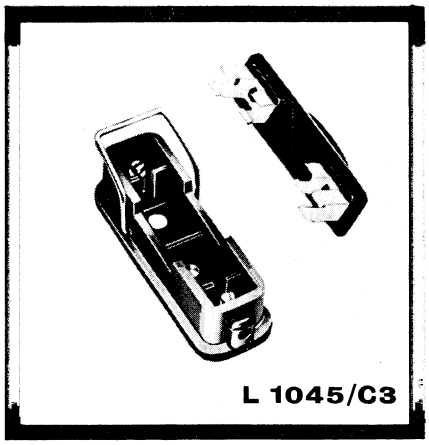




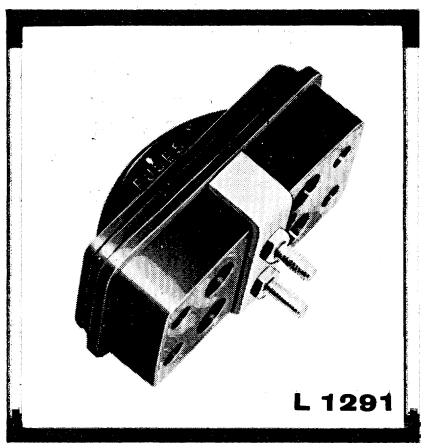
Insertion Resistance:	< 5 milli-ohms
Power Rating (lamp):	> 1·5 watts (temperature rise > 40°C)
Voltage Proof:	2 kV @ 50 Hz
Insulation Resistance:	> 100 megohms
Temperature Range:	-55° to +60°C
Panel Thickness (max.):	0·125 in (3,17 mm)
Fixing Torque (max.):	1,36 Nm (12 lbf-in)
Colours (lens):	Amber, blue, clear, green or red
Materials and Finish:	Body moulding, Phenolic Lens, polycarbonate Contacts, silver-plated
Lamp Style:	5 mm tubular, Lilliput Edison screw cap (E5/8)

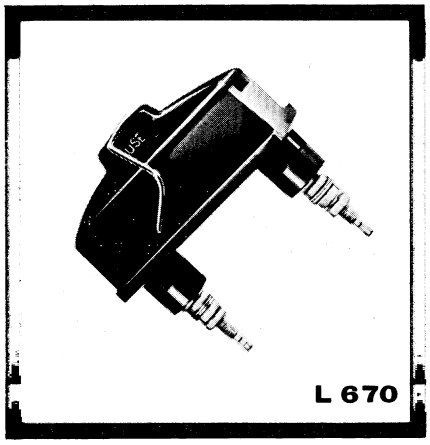
Fuseboxes

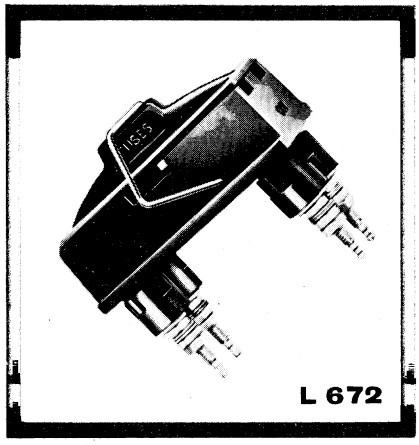
size 0

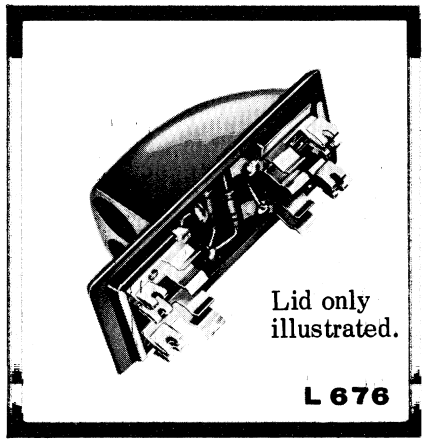

L 1045/C3


L 1033/C4


L 1291


L 670


L 672


Lid only illustrated.

L 676

L 1045/C3 Fusebox, single pole

L 1033/C4 Double pole version

Suitable for chassis or panel mounting, these fuseboxes accept standard 1¼" × ¼" fuse links. These are carried in the lid, and are automatically exposed and isolated from the circuit as the lid is raised. Leads may be inserted through the back or through the ends of the box.

L 1291 Fusebox, double pole, semi-recessed

The carrier of this robust component is retained by a central screw which may be wired to discourage unauthorised access. The body is secured by a clamp below the chassis.

Data

Current rating for 40°C temperature rise: 10A

Breakdown (d.c.): between poles >8kV
poles to chassis >4kV

Temperature range: –40° to +90°C

L 670 Fusebox, single pole, sealed

L 672 Double pole version.

These qualification approved components have beryllium-copper fuse clips, precipitation hardened, which provide consistent contact pressure on the fuse links. Technical data is on page E11.

L 676 Fusebox, indicating, double pole, sealed

Similar to L672, but this unit has two neon lampholders incorporated, with a resistor network so wired that each lamp is extinguished when the associated fuse link blows. The non-reversible lid also fits the L672 base. Supplied without lamps; GEC type 9 and Hivac type 7L are suitable.

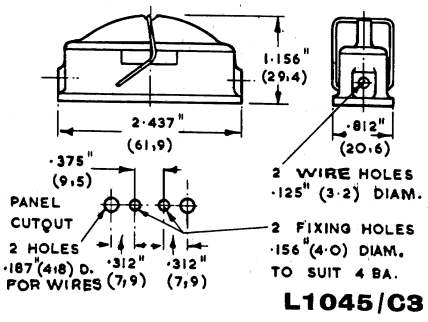
Data: See page E11.

Fuseboxes

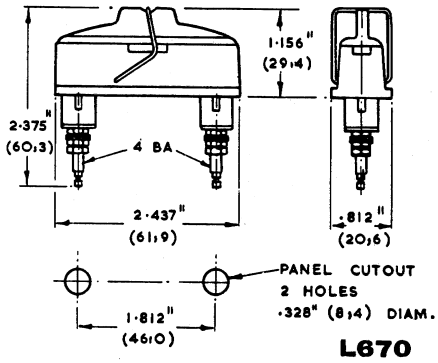
size 0

DIMENSIONS

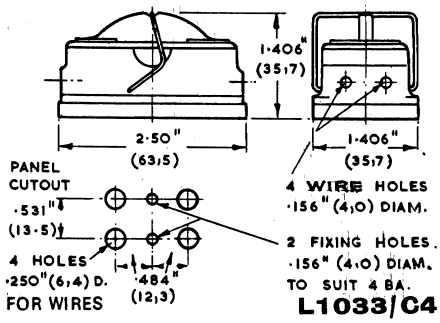
Cut-outs minima, normal tolerance +0·005"
Overall sizes and fixing centres nominal.
Figures in brackets are approx. mm equivalents.



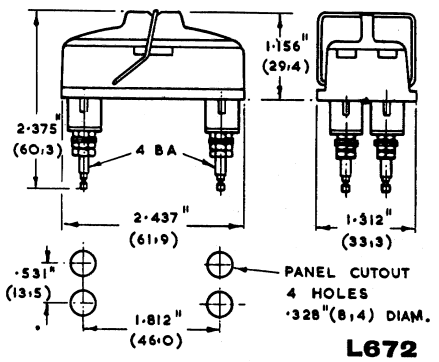
L1045/C3



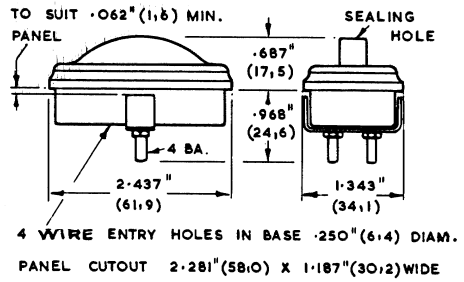
L670



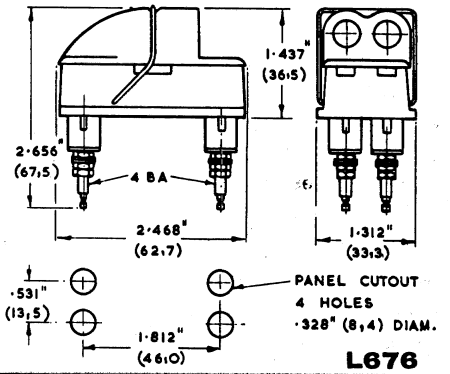
L1033/C4



L672



L1291



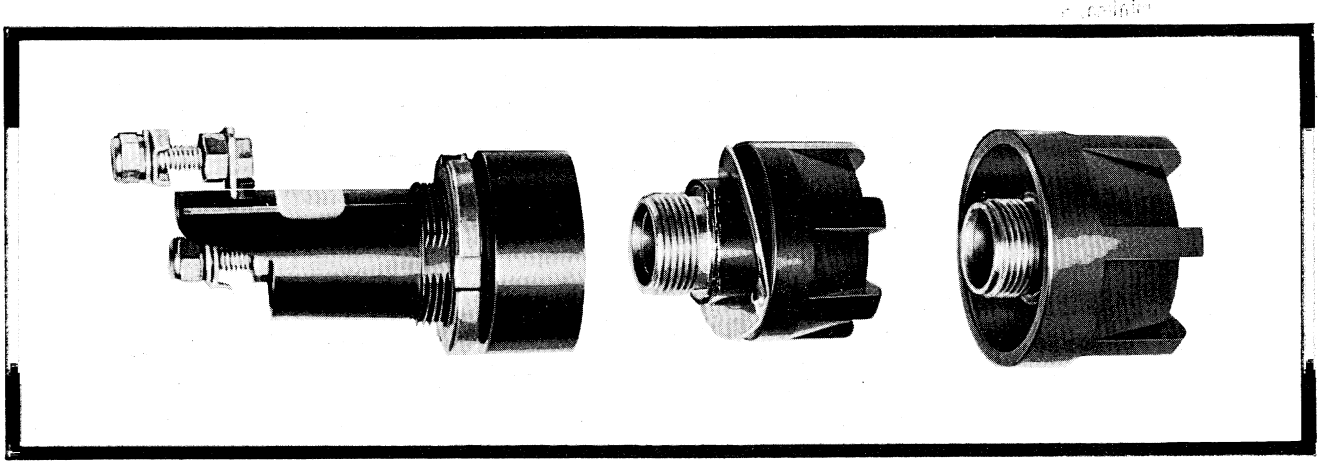
L676

Belling Lee Reference No.	L670 and L672	L676
Specification:*	DEF.64	–
Current Rating:	>7A	10A
Breakdown Voltage (d.c.):	at sea level—at 18000m (60,000 ft)	sea level—18000m
Between Poles:	10kV >1kV	2kV <900V
Poles to Chassis:	>7kV >1kV	8kV >1kV
Insulation Resistance:	>100 megohms	$>10^3$ megohms
Insertion Resistance (per pole):	<20 milliohms	<10 milliohms
Humidity:	Class H_5 (DEF.5011)	–
Temperature Range:	–55°C to +70°C	–
Panel Thickness (max.):	3,2mm (0·125 in)	3,2mm (0·125 in)
Weight (average):	L670, 36g (1·1 oz) L672, 65,2g (2·3 oz)	77,9g (2·7 oz)

*** Temperature rise ⩽ 40°C**

Fuseholders

sizes 1 & 2



Size 1 Fuseholders, panel sealed

L 1302 Complete fuseholder, with large lid

L 1303 As above, but with standard lid

Size 2 Fuseholders, panel sealed

L 1304 Complete fuseholder, with large lid

L 1305 As above, but with standard lid

DIMENSIONS

Cut-outs minima, normal tolerance +0·005"
Overall sizes and fixing centres nominal
Figures in brackets are approx. mm equivalents.

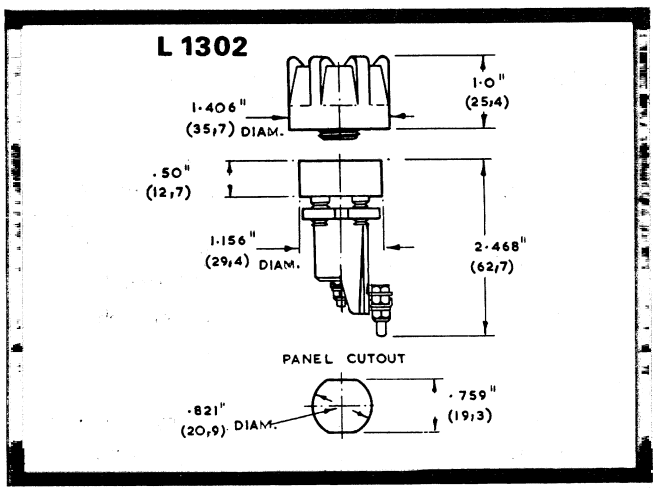
This series of panel mounting fuseholders was developed in collaboration with the Ministry of Supply, for use in military air, sea, and land vehicles, but has many industrial applications, too.

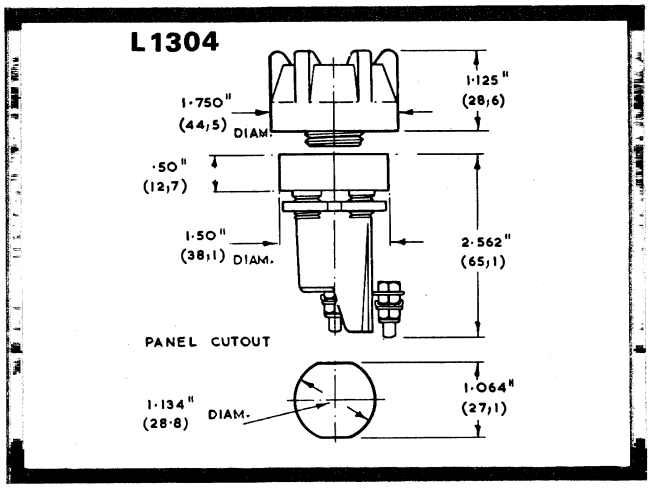
Fuse link withdrawal is effected automatically as the lid is unscrewed. The variety with the larger lid provides a fingerguard and increased creepage path for additional safety, permitting a higher working voltage to be used.

Mounting on the panel is effected through a single hole, shaped to engage the anti-swivel flats on the fuseholder body, which is secured with a ringnut. The terminals are supplied complete with washers and shakeproof nuts.

	L 1302	L 1303	L 1304	L 1305
Current Rating:	15A	15A	30A	30A
Max. Working Volts: (Services' rating)	440V a.c.	250V peak	440V a.c.	250V peak
Insulation Resistance:	>100 MΩ	>100 MΩ	>100 MΩ	>100 MΩ
Insertion Resistance:	<5 mΩ	< 5 mΩ	<5 mΩ	<5 mΩ
Temperature Range:	−40° to +100°C	−40° to +100°C	−40° to +100°C	−40° to +100°C
Sealing:	Leakage less than 1cc/h at 15 lbf/in²			
Panel Thickness (max.):	0.204 in (5,2 mm)	0.204 in (5,2 mm)	0.204 in (5,2 mm)	0.204 in (5,2 mm)
Weight (average):	2·25 oz (64g)	2·0 oz (57g)	4·4 oz (125g)	6·6 oz (187g)

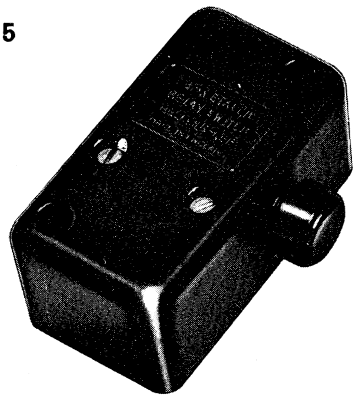
*** Temperature rise ⩽ 40°C**





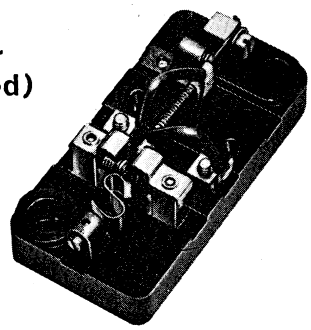
Thermal Delay Devices

L 415



L 413

(Cover removed)



L 413 Delay switch, auto-resetting
L 415 Delay switch, hand-resetting

Thermal delay or protection devices are of two basic types, the directly and the indirectly heated varieties. In the former, the current flows through the bi-metal itself and in the latter, a separate heater winding is used.

The various contact arrangements available are illustrated overleaf, and the simple external connection of terminals 3 and 8 on types /1A and /1AX allows series heater operation if required.

The following method of coding is used to differentiate between the different varieties and defines their performance parameters.

Typical Belling-Lee reference no.: L 413/1A/4/12V

The 1st. suffix defines the contact arrangement, viz., 1A, 3A, 1AX or 3AX, as illustrated overleaf.

The 2nd. suffix defines the time of operation in seconds: /1 = 0·5–5; /2 = 5–10; /3 = 10–15; /4 = 15–30; /5 = 30–60.

The 3rd. suffix defines the tripping voltage or current rating of the heater winding, if any.

The specimen list number covers an indirectly heated auto-resetting delay switch, with an operating time of 15–30 seconds, and a 12-volt heater.

NOTE:– These times of operation cover the application of these devices as delay switches. If used for overload protection, the operating time is 30–60 sec for 100% current or voltage overload. All figures apply at a normal ambient temperature of 20°C.

If the heater is to be used independently, and the current carried by the bi-metal is over 5 amp, this will tend to reduce the time of operation.

Directly heated types /3A and /3AX

These may be used in any series circuit having an operating current of 5–15A a.c.

Operating Current:	5–15 A
Max. Working Voltage:	250 V a.c. 50 V d.c. at 5A max.
Operating Times **As a delay switch:** **As an overload switch:**	 10-15, 15-30, or 30-60 sec 30-60 sec at twice rated current or voltage
Max. Reset Time:	120 seconds

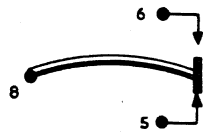
Indirectly heated types /1A and /1AX

These are for use where the operating current is not greater than 5 amp. The maximum continuous heater dissipation is 3 watts, giving delays of 30–60 seconds. For time delays of less than 30 seconds, the heater circuit should be provided with a device to limit the current as soon as the main contacts have separated.

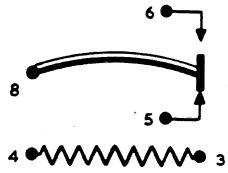
Operating Current:	52mA–5A
Max. Heater Voltage:	48V a.c. or d.c.
Heater Resistance Tolerance:	± 10%
Heater/Bi-metal Insulation:	1800V d.c. proof tested
Operating Times **As a delay switch:** **Equivalent Heater Ratings:** **As an overload switch:**	 0·5–5, 5–10, 10–15, 15–30, 30–60 sec 20, 10, 6, 5, 3 watts 30–60 sec at twice rated current or voltage
Max. Reset Time:	120 sec for 5–15 sec operating time 60 sec for 15–60 sec operating time

Thermal Delay Devices

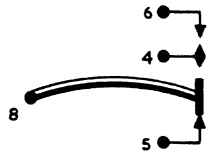
TYPE 3 A
DIRECTLY HEATED



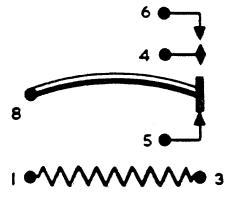
TYPE 1 A
INDIRECTLY HEATED



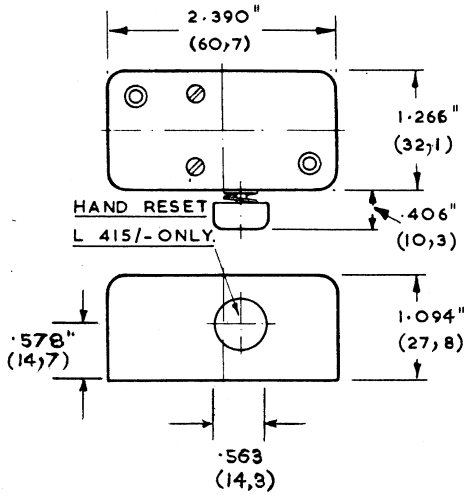
TYPE 3 AX
DIRECTLY HEATED
AUXILIARY CONTACT
AUTO RESETTING
ONLY (L413)

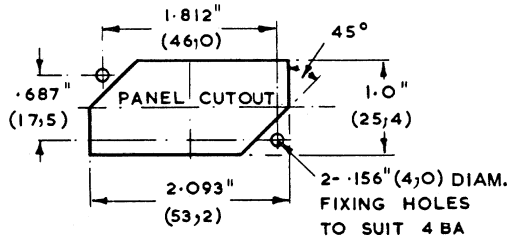


TYPE 1 AX
INDIRECTLY HEATED
AUXILIARY CONTACT
AUTO RESETTING
ONLY (L413)



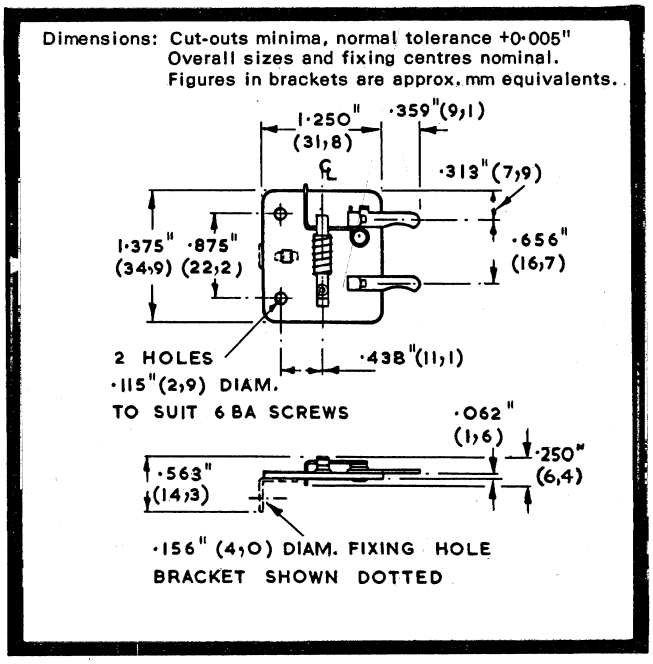
L 413 & L 415





DIMENSIONS

Cut-outs minima, normal tolerance +0·005"
Overall sizes and fixing centres nominal.
Figures in brackets are approx. mm equivalents.



L 430 "Minitrip"
L 430/B "Minitrip" with bracket

This miniature, resettable, protection device has delayed action characteristics which enable it to handle, without tripping, short duration overloads amounting to a few hundred per cent., which are harmless to the equipment. They would, of course, rapidly destroy a conventional fuse link.

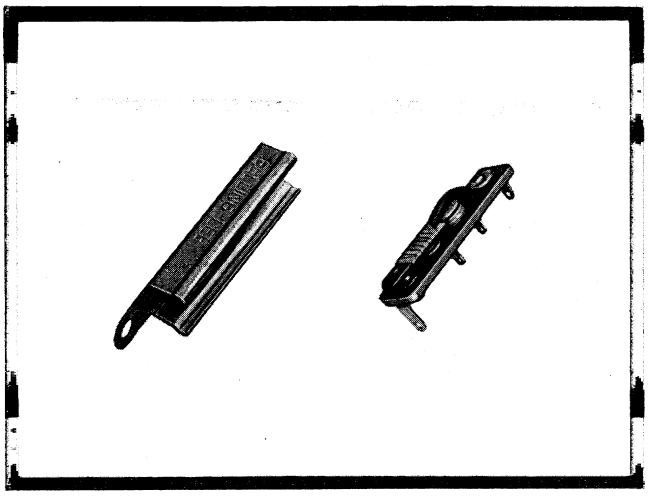
The "Minitrip" operates on sustained overloads of 100% within 10–60 seconds. It is also capable of dealing with fault conditions of considerable magnitude, although overloads of more than 10 times the rating may result in destruction of the winding, especially in the lower ratings.

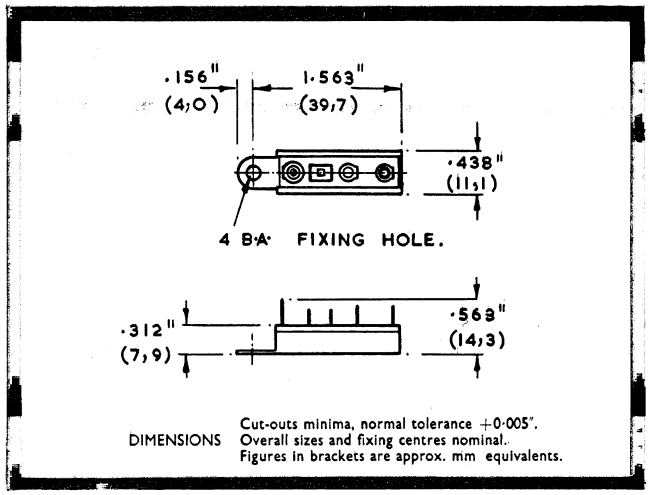
Current Ratings:	100, 150, 200, 250, 300, 500, 750mA, 1, 1·5 and 2A
Normal Heater Dissipation:	0·33/0·37 watt
Typical Operating Times for different overloads, at 20°C:	100% 10–60 sec 200% 4–13 sec 300% 2·5–8 sec 400% 1·5–6 sec 500% 1–4·5 sec

NOTE:
Although not intended for use as a temperature-operated switch, the operating time is affected by ambient temperature, and above 50°C the device may trip on rated current.

Belling-Lee reference nos.: L430/rating and L430/B/rating.

Example: L430/100 is a "Minitrip" which will carry 100mA without tripping at temperatures up to 50°C.





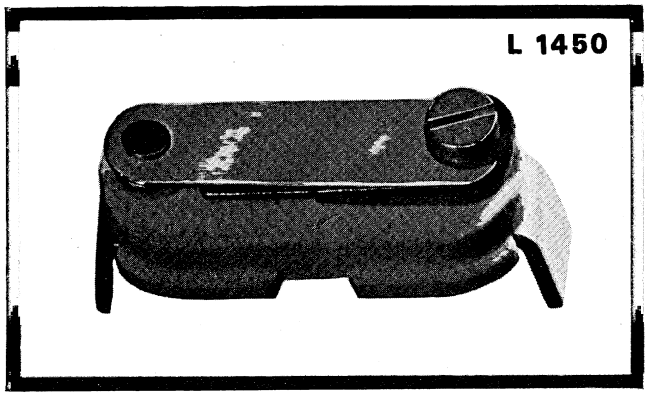
L 422/ Miniature delay switch, auto-resetting

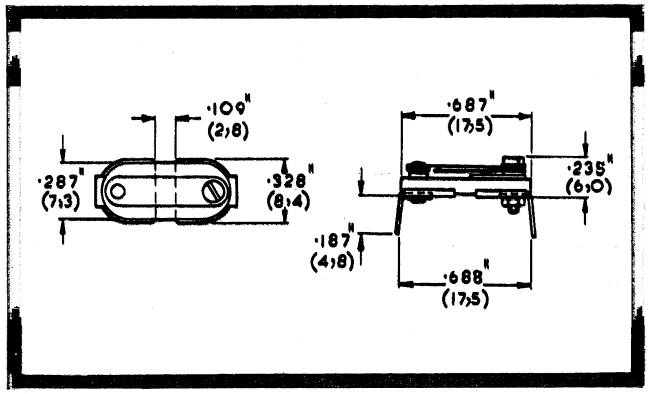
A general purpose, indirectly heated, delay switch for controlling circuits of low power. Currents up to 1A can be switched, depending on the nature of the voltage across the contacts (max. 25V a.c.).

If the heater is connected in series with the switch contacts, the current will flow through the bi-metal element and may affect the timing.

Standard heater voltage 6 V, dissipation 1·5 watts.

Endurance:	250,000 operations at 25V a.c.
Weight (average):	0·37 oz (10,64g)
1st. suffix: (Contact arrangement)	/IB = contacts normally open /IC = contacts normally closed
2nd. suffix: (Operating time)	/A = adjustable delay, 0·5–45 sec /L = long delay, 10–45 sec /S = short delay, 0·5–10 sec
Typical Belling-Lee reference no.:	**L 422/1C/L.** This is a miniature delay switch with contacts normally closed, operating within 10–45 seconds.



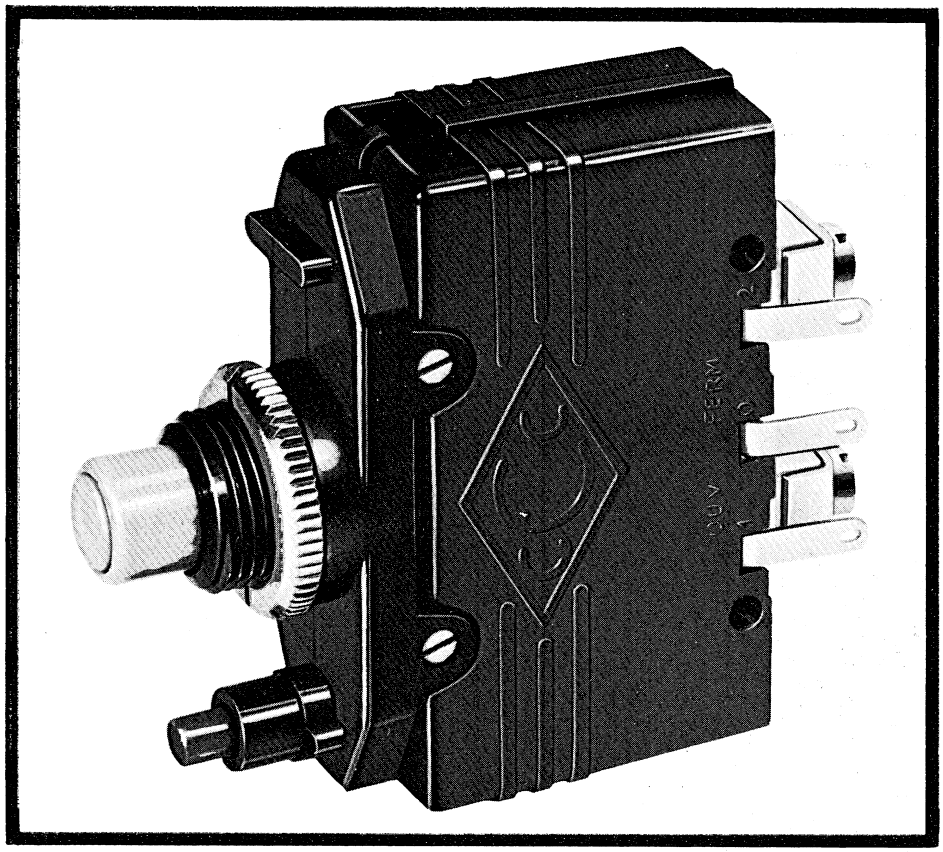


L 1450 Thermostat

Originally designed to control the temperature stability inside the heated enclosure, or "oven", in which a resonant crystal is mounted when it is required to hold a very close tolerance of the operational frequency, this miniature thermostat will be found equally useful in all similar applications where temperature maintenance is essential and can be achieved for a moderate expenditure of power. A grub-screw is provided for varying the controlled temperature and this is normally supplied unset, for adjustment by the user.

The body moulding is of ceramic material possessing high mechanical stability, and heavy silver contacts are fitted.

Circuit Rating (max.):	24V, 1A a.c.
Adjustable to any temperature in the range:	45° to 130°C
Temperature Control:	± 1°C
Weight (average):	1,7 g (0·06 oz)



The Belling-Lee "Securex" miniature circuit breaker provides the three functions of circuit protection, switching and indication of state in a robust, compact, precision unit. It has a wide range of applications in all types of electrical and electronic equipment.

Like a fuse, the speed of operation of the "Securex" on overload varies inversely as the magnitude of the over-current, but the circuit breaker has the advantage of being able to withstand harmless surges without tripping. Having no fusing element, embrittlement is not a hazard and the characteristics remain constant throughout the long life of the device. A further advantage is the ability to restore a circuit rapidly after faults have been cleared.

Preferred current ratings (i.e. maximum running current values) extend from 300mA to 20 A, as detailed on page E21, and all models have a fully tropicalised finish.

The action is "trip free", which means that a circuit cannot be held closed by the "reset" button while fault conditions exist.

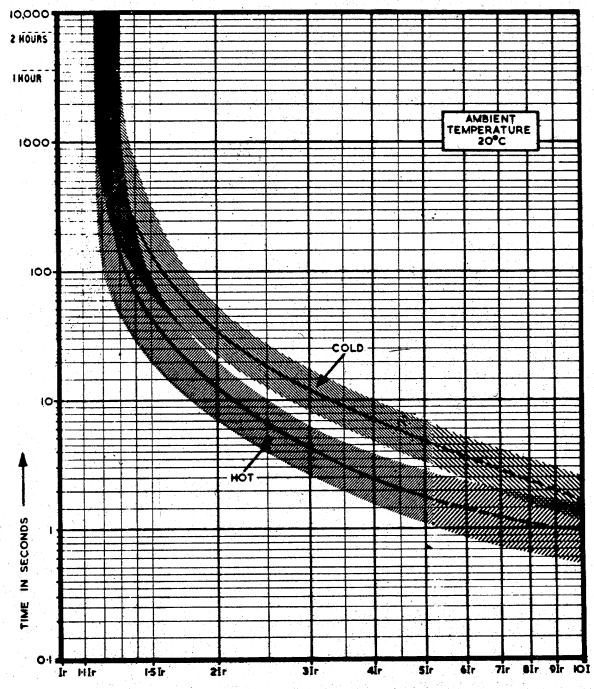
The maximum breaking capacity is 500 amp at 275 volts a.c. and 0·8 power factor for ratings of 5 amp and over, and 300 amp for ratings below 5 amp. Secondary contacts are fitted for breaking the arc under these conditions, so that the main circuit contacts are not eroded, and a vent is provided in the case to allow for gas expansion.

Two basic types are available, the L5100 series, operating thermally, and the L5200 series, thermal-magnetically.

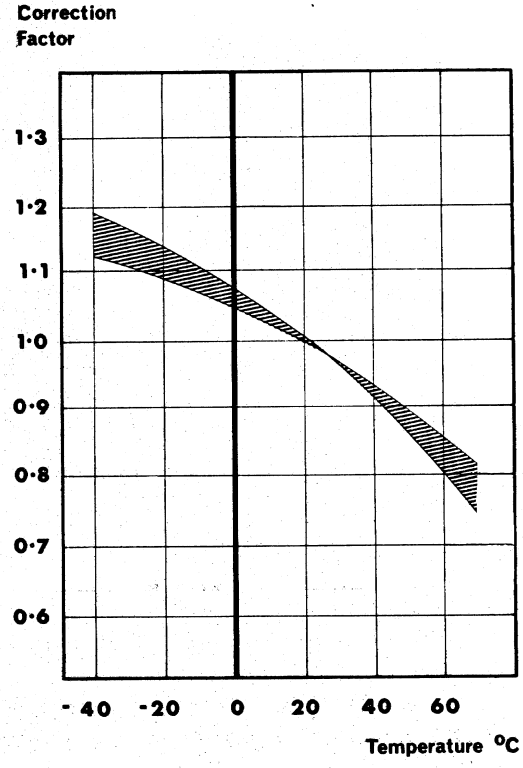
Thermal operation is triggered by the flexing of a bi-metallic element under the influence of heat generated by the passage of the current. In ratings below 2 amp a separate heating element is incorporated, but for higher ratings, the heat is generated in the bi-metallic element itself. The speed of operation in each case is governed by the rate of heat build-up in the bi-metal; this increases proportionally to the square of the current, with a delay that ranges from several minutes to one or two seconds. In circuits where large continuous fault currents can occur, a backing fuse should be included to protect the circuit breaker elements from rupturing if over-currents are likely to exceed the values given below:–

M.C.B. rating	Max. continuous over-current at 250 V a.c., 0·8 p.f.
0.3 to 1A	10 × Ir
2A and 3A	100 × Ir
5A to 20A	500A

THERMAL RELEASE CHARACTERISTICS OF A TYPICAL BELLING-LEE MINIATURE CIRCUIT BREAKER



LIMITS OF THE INFLUENCE OF TEMPERATURE



The L5200 series operates thermally on moderate over-currents, but with large fault currents (above 6 to 10 times the rated current) a magnetic coil takes charge, tripping the mechanism virtually instantaneously, i.e. in a matter of milli-seconds. This series of circuit breakers meets the majority of requirements.

The recommended standard types are panel mounted by means of a central threaded boss. However, they can be converted for plug-in mounting in switch boxes, etc., by using 4mm plug pins in place of the two terminal screws. The "reset" button has a length of travel of nearly ¼ in, so that it projects well beyond the central boss when the mechanism has tripped, providing a clear indication of the circuit condition. An additional set of change-over contacts can be included for remote signalling, if required, and also the trip button can be omitted so that the device becomes a protective cut-out.

As with most thermally operated devices, unless specially compensated, ambient temperature variations will affect the performance and, when selecting a rating, it is prudent to allow for this in order to avoid false operation.

The specified rating of these miniature circuit breakers is determined at a normal ambient temperature of 20°C. At lower temperatures the rating may be increased and vice versa, and the nominal value should be multiplied by a correction factor which may be obtained from the accompanying graph.

Example: L5200/5
The rating at 20°C is 5A
At 0°C, the correction factor i
the rating is 1.05 × 5 = 5.2
At 40°C, the correction factor is 0.92
the rating is 0.92 × 5 = 4.6 A

L5100 SERIES Thermal operation
L5200 SERIES Thermal-magnetic operation

Preferred Current Ratings (Ir):	0·3, 0·5, 0·7, 1, 2, 3, 5, 8, 10, 15 and 20A The circuit breakers will hold in indefinitely on all currents up to 1·1 times the rated value
Breaking Capacity (max.):	300A for ratings up to 3A 500A for ratings of 5A and over at 0·8 power factor
Tripping Times:	At 1·5 × Ir < 5 min *At 10 × Ir a.c. < 10 m.sec At 2 × Ir < 60 sec * At 15 × Ir d.c. < 10 m.sec At 5·5 × Ir < 7 sec *Magnetic
Breakdown Voltage (d.c.):	> 4 kV between terminals > 6 kV between linked terminals and metal panel
Working Voltage (max.):	275V a.c. (r.m.s.) 60V d.c.
Insulation Resistance:	> 10^3 M Ω

Insertion Resistance:

Rating	L5100	L5200	Tol.	Rating	L5100	L5200	Tol.
0·3A	8·1 Ω	9·2 Ω	± 16%	5A	46 mΩ	50 mΩ	± 16%
0·5A	2·9 Ω	3·3 Ω	± 16%	8A	24 mΩ	26 mΩ	± 16%
0·7A	1·6 Ω	1·8 Ω	± 16%	10A	17 mΩ	18·5mΩ	± 25%
1A	0·8 Ω	0·9 Ω	± 16%	15A	9 mΩ	10 mΩ	± 30%
2A	95mΩ	0·12Ω	± 16%	20A	6 mΩ	6 mΩ	± 50%
3A	70mΩ	80mΩ	± 16%				

Temperature Range:	–55° to + 70°C
Heat Cycles:	H_5 (DEF–5011)
Altitude:	D_1. Satisfactory to 9000 m (30,000 ft) (DEF–5011)
Acceleration:	A_1. Satisfactory to over 35 g (DEF–5011)
Signalling Contacts: (if fitted)	Single pole change-over Max. rating 1A at 250V a.c. or 50V d.c.
Max. Wire Size:	7/·029"
Weight (average):	according to type, 1·9 oz (54 g) min., 2·3 oz (65 g) max.

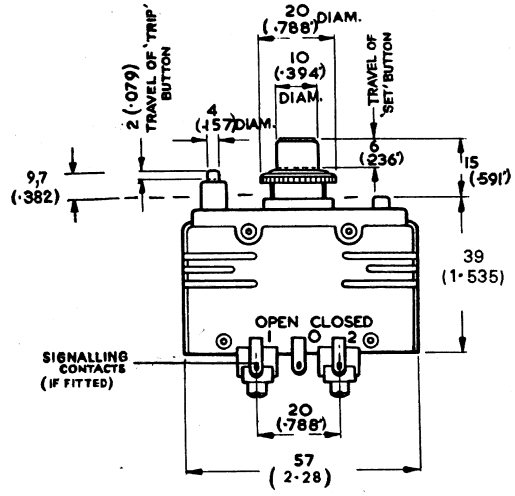
Types available:

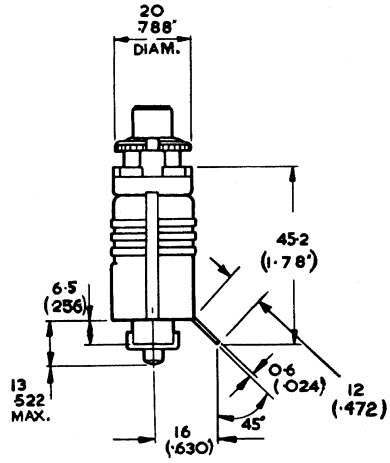
List Number		Description
Thermal	Thermal-mag.	
L5100/Ir	L5200/Ir	Cut-out (i.e. no "trip" button)
L5101/Ir	L5201/Ir	Circuit breaker (i.e. with "trip" button)
L5110/Ir	L5210/Ir	Cut-out with signalling contacts
L5111/Ir	L5211/Ir	Circuit breaker with signalling contacts

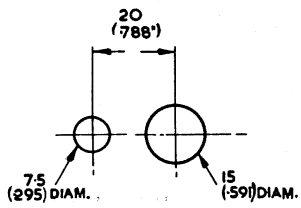
Ir denotes maximum running current in amp

Example:– L5211/5 is a thermal-magnetic circuit breaker fitted with "trip" button and auxiliary signalling contacts for controlling a circuit in which the normal current is up to 5 amp at 20°C.

Miniature Circuit Breakers & Cut-outs

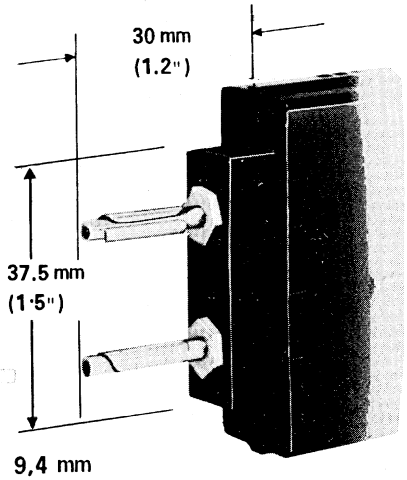






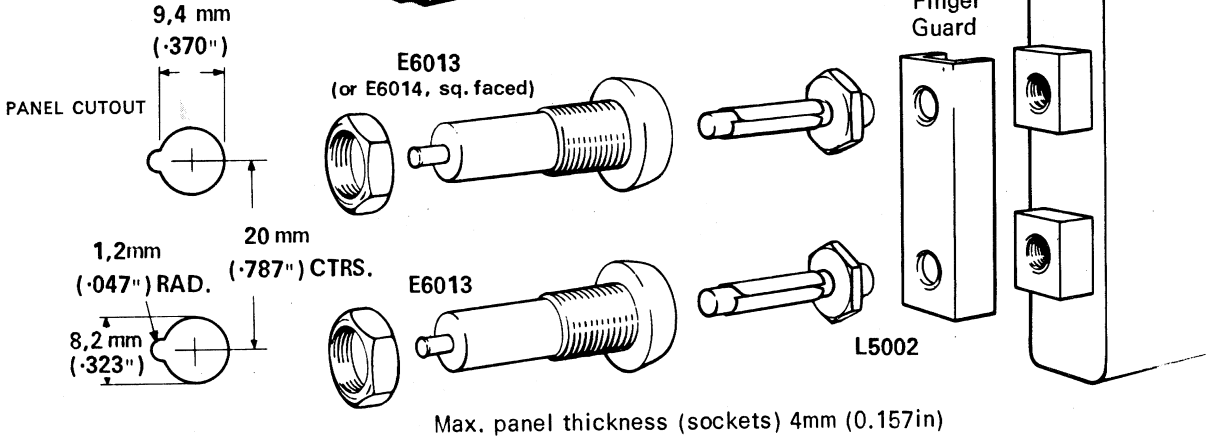
Max. panel thickness 4mm (0.157)

Dimensions are nominal, in mm; figures in brackets are approximate equivalents in inches.



Plug-in conversion kit, L5002.

When a plug-in facility is required, e.g. on multi-purpose test rigs, etc., 2 Belling-Lee 4mm 'O–Z' plug pins and a finger guard can be fitted in place of the standard terminal screws, as shown below.



Max. panel thickness (sockets) 4mm (0.157in)