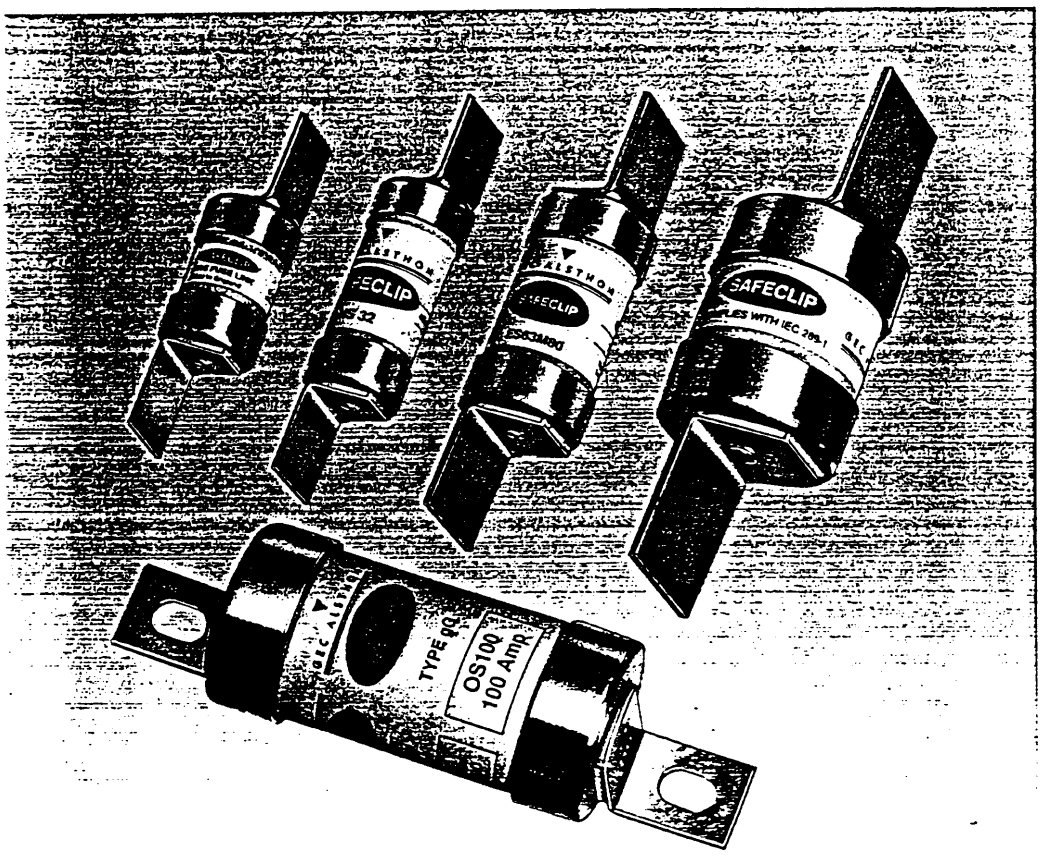
899-057 to 899-100.

Compact Fuse Links



7

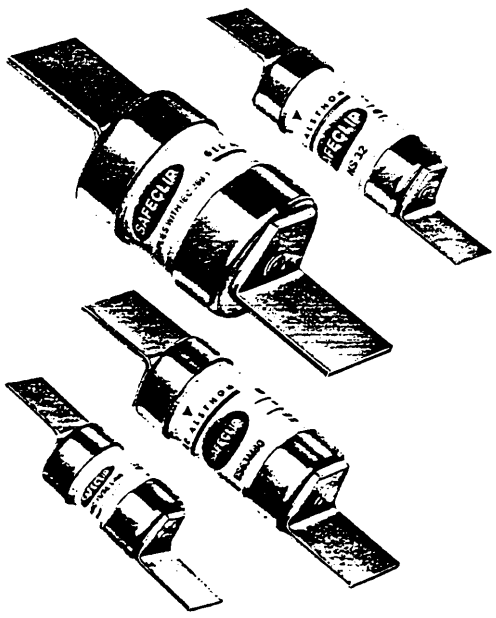
GEC ALSTHOM

LOW VOLTAGE EQUIPMENT

'SAFECLIP'

Compact fuse links to BS 88:Parts1or6:1988 for use in 'SAFECLIP' fuse holders and fuse switches

Contents



Performance Data

A.C. performance

The standard ratings are ASTA 20 certified at 80kA, 440 Volt* to BS 88:Part 1 or Part 6:1988.

** SS types are certified at 16·5kA, 240 Volt, and the NS32M40, ES63M80 and XS125 at 80kA, 415 Volt.*

Protection of PVC insulated cables

Standard 'gG' ratings of 'SAFECLIP' fuse links provide complete protection to PVC insulated cables when applied in accordance with rule 433-02 of 16th Edition, IEE Wiring Regulations (ie. when their current ratings are equal to, or less than, those of the cables).

Discrimination

'SAFECLIP' fuse links will discriminate with each other at fault levels up to their rated a.c. performance when the ratio between 'major' and 'minor' current ratings is 2:1 (See Application Notes).

Protection against electric shock

The values of maximum earth loop impedance (Z_s) given in Table 41D(a) of 16th Edition, IEE Wiring Regulations are applicable to circuits protected by 'SAFECLIP' fuse links, to give good protection against electric shock in fixed installations.

Energy conservation

All 'SAFECLIP' fuse links have low power loss values, well within the limits specified in BS 88:1988.

Motor starting ability

All 'SAFECLIP' fuse links are suitable for use in motor circuits and have superior motor starting ability (See page 2/4).

Approvals

Manufactured to BS 5750:Part 1:1987, 'Quality systems : design/development, production, installation and servicing', and approved by leading independent authorities.

Application Notes

Short circuit energy limitation and discrimination

The designers of electrical equipment such as switches and contactors have to prove their products under the worst possible conditions (ie. at maximum breaking capacity, at 110% rated voltage, very low power factor, and with faults initiated at the most onerous points on the voltage wave), and they require relevant data from the fuse link manufacturer. This is given in the cut-off current characteristics and I^2t Values on pages 2/5, 2/6 and 2/7. However, in service the short circuit fault conditions are usually less exacting than those produced in proving tests. In particular, the circuits are usually three-phase with relatively high power factor. In practice, therefore, the I^2t values of 'SAFECLIP' fuse links are significantly less than those tabulated and they will discriminate with each other if the ratio between 'major' and 'minor' fuse links in series is 2:1. Where 'SAFECLIP' fuse links are used as the minor rating in series with a 'RED SPOT' range fuse link as the major rating then discrimination at 415/240 Volt will generally be achieved with a ratio of 1.6:1.

Applications

Equipment	Refer to Publication number for details	Fuse link type accommodated in equipment				
		SS	NS	ES	XS	OS
'SAFECLIP' HRC Fuse holders and Fuse banks	IEF/402	•	•	•	•	•
'SAFECLIP' Distribution Fuse boards	IEF/403	•	•	•		•
'SAFECLIP' Fuse Combination Units – Type MSS	IEF/498		•	•	•	
'SAFECLIP' Wall Mounting Fuse Combination Units – Type WMS	IEF/503		•	•	•	
'SAFECLIP' Panel boards	IEF/450		•	•	•	
Type MST100 Fuse switch	IEF/404					•
Type WM1003N Wall Mounting Fuse Switch	IEF/503					•

List Numbers and Dimensions

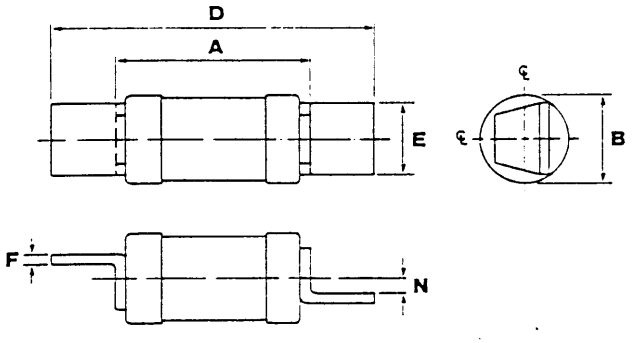


Figure 1

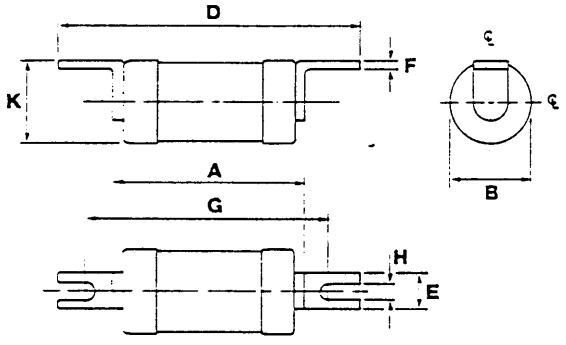


Figure 2

List number prefix	Current rating Amp	Figure number	Dimensions *in millimetres* A max	B max	D max	E	F	N
SS	2*, 4*, 6, 10, 16, 20	1	25	14.5	51	11	0.8	3.6
NS	2, 4, 6, 10, 16, 20, 25, 32, 32M40*	1	35.5	14.5	62	11	0.8	3.6
ES	40, 50, 63, 63M80*	1	39	17.5	69	15	1.25	3.6
XS†	20*, 32*, 63*, 80*, 100*, 125*	1	39	26.4	80	19	1.6	3.6
			A	B	D	E	F	G	H	K
OS	80*, 100*, 100M125*	2	58	26.4	90.5	12.7	1.2	73	5.2	27.8

** These types are ASTA Certified to BS 88 Part 1: 1988*

† Intermediate and minor rating are also available down to 2 Amp.

Motor Circuit Protection

Select HRC fuse links to protect 3-phase motor circuits as follows:

1) Obtain motor full load current from Table 1.
2) The following motor starting conditions are assumed:

   Direct-On-Line:

   Up to 1 kW: 5 x FLC for 5 secs.
   1.1 to 7.5 kW: 6 x FLC for 10 secs.
   7.6 to 55 kW: 7 x FLC for 10 secs.

   Assisted Start:
   Up to 1 kW: 2.5 x FLC for 20 secs.
   Greater than 1 kW: 3.5 x FLC for 20 secs.
3) Choose the recommended fuse link for the motor FLC and starting condition from Table 2 (DOL start) or Table 3 (assisted start).
4) Ensure voltage rating of fuse link is adequate for the application (See page 2/2).

The recommended fuse link ratings apply for up to 8 starts per hour under stated starting conditions. They may need to be adjusted if any of the following conditions occur singly or in combination:

a) Starting currents in excess of assumed values.
b) Longer starting times than those stated.
c) Large number of starts per operating cycle.
d) High enclosure temperature.

Table 1 Full load currents of typical 3-phase induction motors at voltages shown

Motor rating		Voltage			
kW	HP	220	380	415	440
0.37	0.5	2.0	1.15	1.05	1.0
0.55	0.75	2.7	1.6	1.5	1.4
0.75	1	3.9	2.3	2.0	1.9
1.1	1.5	4.7	2.8	2.5	2.4
1.5	2	6.5	3.8	3.5	3.3
2.2	3	9.3	5.4	5.0	4.7
3	4	12	7.1	6.5	6.1
4	5.5	15.4	9.0	8.4	7.9
5.5	7.5	20.7	11.9	11	10.3
7.5	10	28	16.1	14.4	14
11	15	39.1	23	21	19.8
15	20	52.8	30.5	28	26.4
18.5	25	66	38	35	33
22	30	77	45	41	39
30	40	103	60	55	52
37	50	–	75	69	65
45	60	–	87	80	75
55	75	–	107	98	92

Table 2 Direct-on-line starting

Motor FLC Amp From	to	Fuse Current Rating Amp	Fuse Type
0	0.7	2	NS_3
0.8	1.4	4	
1.5	2.0	6	
2.1	3.0	10	
3.1	6.1	16	
6.2	9.0	20	
9.1	11	25	
11.1	14.4	32	
14.5	18	40[1]	ES_3
18.1	22	50	
22.1	28	63	
28.1	38	80[2]	XS
38.1	53	100	
53.1	72	125	
28.1	45	80	OS
45.1	58	100	
58.1	80	100M125	

1) NS32M40 is alternative fuse type if FLC does not exceed 32 Amp & voltage is 415 Volt or less.
2) ES63M80 is alternative fuse type at 415 Volt or less.
3) XS fuse links are also available in minor ratings below 80 Amp.

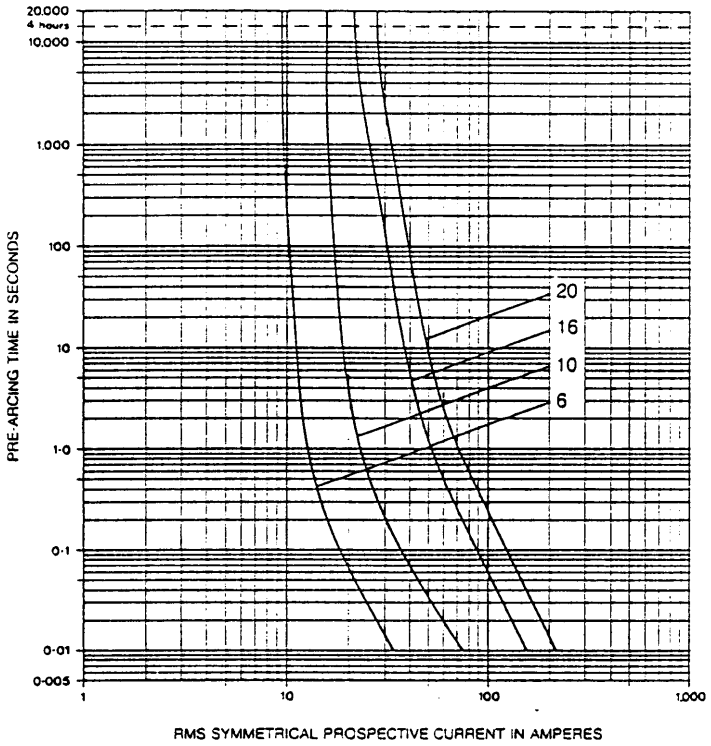
Table 3 Assisted starting (star/delta, etc.)*

Motor FLC Amp From	to	Fuse Current Rating Amp	Fuse Type
0	1.4	2	NS_3
1.5	2.1	4	
2.2	3.1	6	
3.2	5.5	10	
5.6	10	16	
10.1	14	20	
14.1	18	25	
18.1	22	32	
22.1	32	40[1]	ES_3
32.1	40	50	
40.1	51	63	
51.1	80	80[2]	OS or XS
80.1	100	100	
100.1	125	125	XS

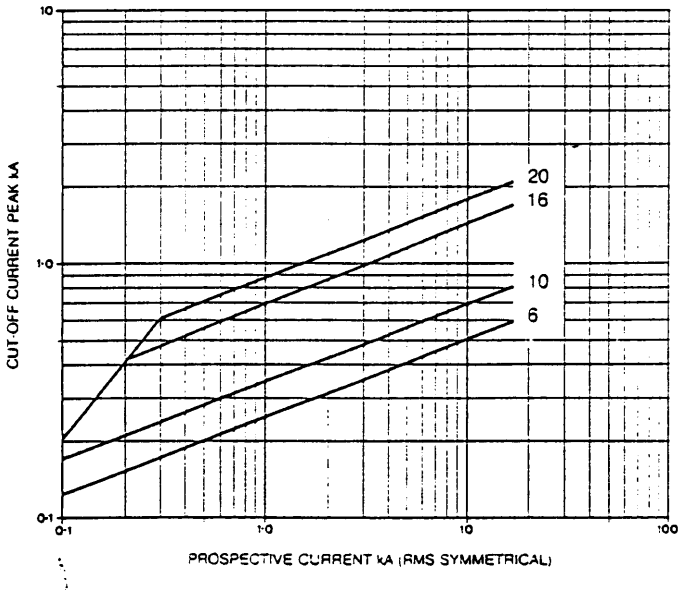
** The assisted starting recommendations apply for ambient temperatures up to 35°C. At higher temperatures, some ratings may need to be derated. Consult GEC ALSTHOM Low Voltage Equipment Limited for further information.*

Characteristics

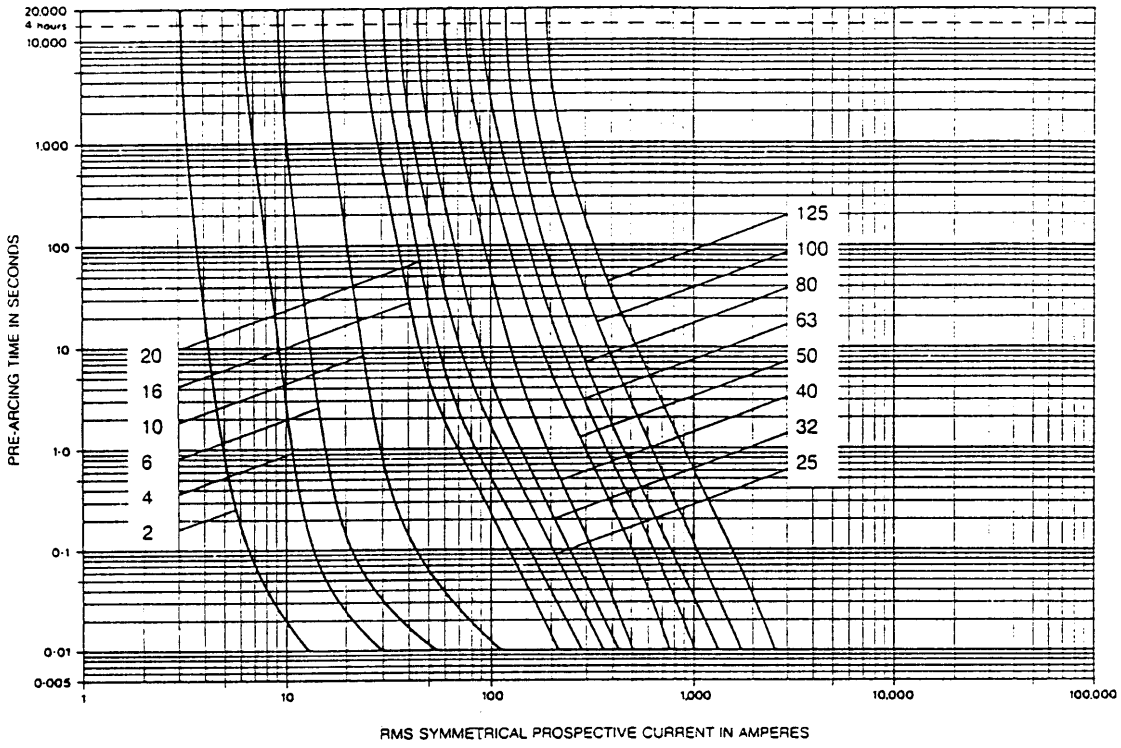
'SAFECLIP'
Type SS
Time/Current Characteristics
6-20 Amp



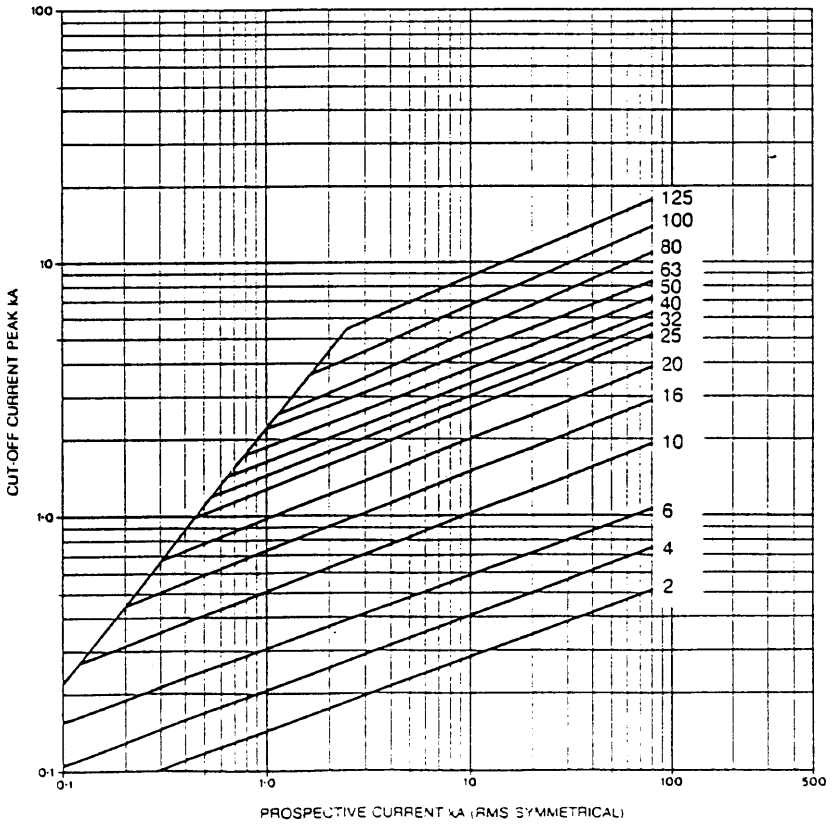
'SAFECLIP'
Type SS
Cut-off Current Characteristics
6-20 Amp



'SAFECLIP'
Types NS, ES & XS
Time/Current
Characteristics
2-125 Amp



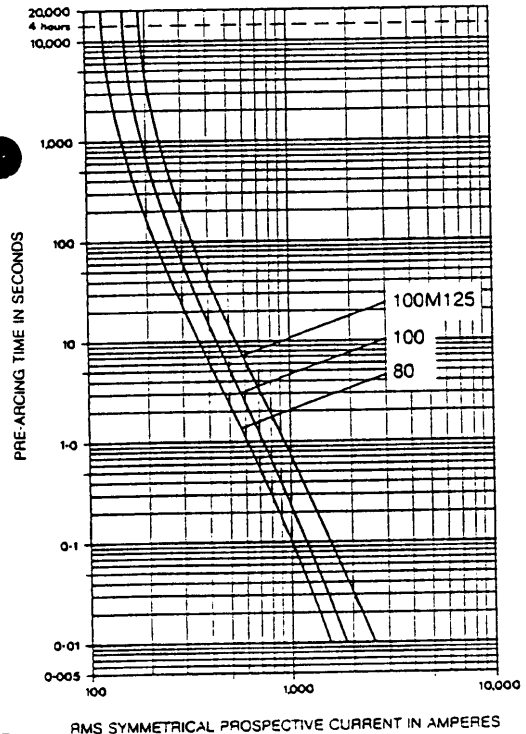
'SAFECLIP'
Types NS, ES & XS
Cut-off Current Characteristics
2-125 Amp



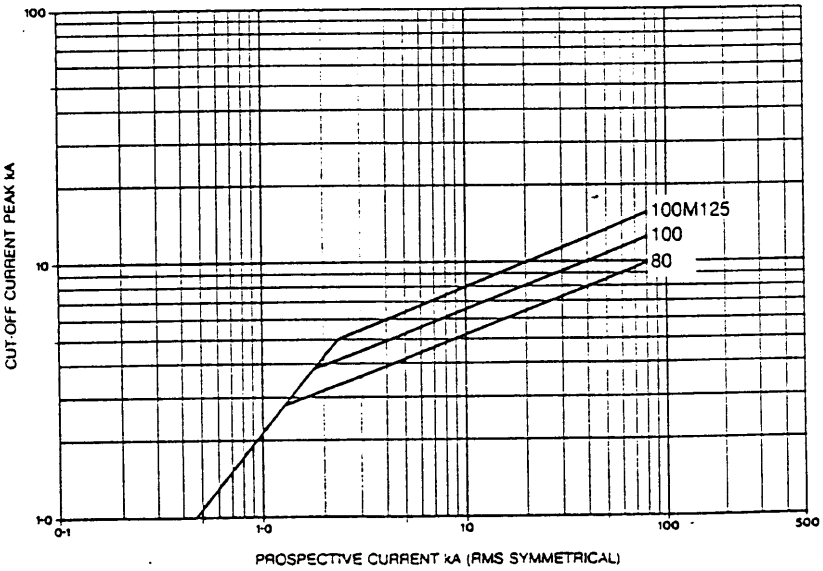
'SAFECLIP'
Types NS, ES & XS
I^2t Values*

Current Rating Amp	Pre-Arcing I^2t (A^2 Sec)	Total I^2t (A^2 Sec)
2	1.5	16
4	7.0	75
6	22	200
10	90	440
16	300	1300
20	520	2200
25	900	3000
32	1100	4000
40	2400	12000
50	3200	15000
63	5400	25000
80	8000	45000
100	15000	68000
125	32000	145000

Type OS
Time/Current Characteristics
80-125 Amp



Type OS
Cut-off Current Characteristics
80-125 Amp



Type OS
I^2t Values*

Current Rating Amp	Pre-Arcing I^2t (A^2 Sec)	Total I^2t (A^2 Sec)
80	14000	40000
100	17000	60000
100M125	32000	128000

I^2t values at 440 Volt when tested under BS88 conditions. XS125 at 415 Volt.