Data Sheet

BS88 HBC Fuselinks, type T

HBC* fuselinks ASTA** certified to BS88: Part 2: 1975, suitable for general purpose industrial applications (eg. heating and lighting circuits) and for short circuit protection of motor control circuits.

These fuselinks also meet all the requirements of IEC269: Parts 1 and 2: 1986 (and hence also the pending revisions of BS88: Parts 1 and 2).

*HBC (High Breaking Capacity) is sometimes denoted as HRC (High Rupturing Capacity). The former term is that used in the British Standards.

** ASTA is the Association of Short-circuit Testing Authorities.

Construction

Figure 1 shows a typical GEC type 'T' fuselink. Its fusible elements are made from 'silverbond' as shown in Figure 2a. Each element consists of short circuit zones (i) and an overload zone (ii). M-effect is the process whereby the element breaks up the zone (ii) when a persistent overload occurs. The overcurrent must generate sufficient heat to melt the tin in the silver section of the element. Once the tin becomes liquid, particles of silver migrate rapidly into it. In this way the element breaks up in this zone at a temperature of about 230°C (ie. much lower than the normal melting point of silver, 960°C).

With elements made completely from copper, it would be much more difficult to produce an effective overload zone, as described above, because copper particles do not migrate into liquid tin as rapidly as silver ones. Hence a higher temperature (about 400°C) is needed to break up the copper element than its silver counterpart. To overcome this disadvantage, manufacturers of copper only elements place the tin deposit on or near the reduced section as shown in Figure 2b. This can, in turn, produce its own problems, either of premature operation or of overheating (due to the tin being dispersed over a wide area as fast as it melts).

Features

- ASTA (20) certified at 80kA breaking capacity, for ac voltages as tabulated
- ASTA certified at 40kA breaking capacity, for maximum dc voltages as tabulated
- ASTA certified in combination with motor control gear components, manufactured by Télémecanique and MTE, for Type 'C' co-ordination as defined by BS4941: Part 1: 1979
- Unequalled combinations of ac and dc breaking capacities achieved by using 'silverbond' elements
- Optimum time-current characteristics giving superior motor starting ability and quick response to fault conditions
- Low power dissipation; values well within the limits of BS88: Part 2, allowing associated equipment to run cool and to minimise energy loss
- Motor circuit range included to provide a means of protecting motors economically.

†'ASTA (20) certified' endorsement on a low voltage fuse link indicates that the design has been successfully tested and certified by ASTA to the relevant British Standard and that the fuse links are examined periodically under the ASTA surveillance scheme.

Figure 1 **Fuselink construction**

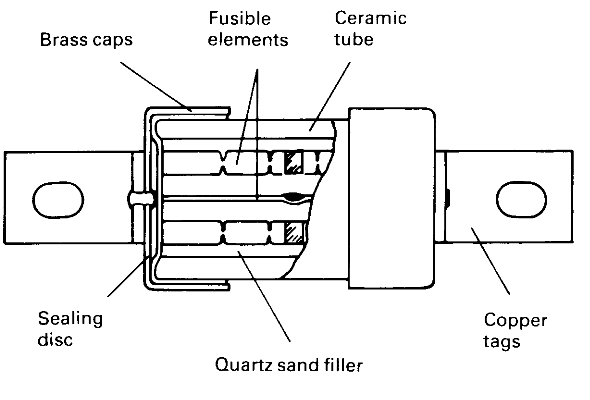
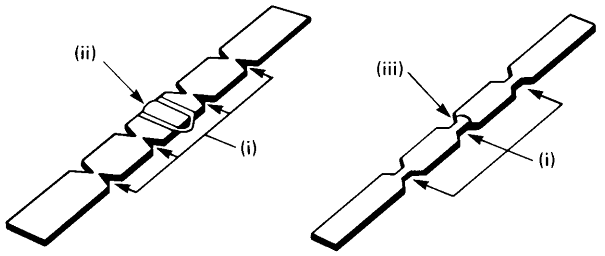


Figure 2 Fuse elements



(a) Silverbond element

(b) Typical copper element

(i) Reduced sections in copper portions, where arcing is initiated when a short circuit fault occurs.
(ii) Central silver section, in which a trough is formed and filled with tin, to produce 'M' effect when a prolonged overload fault occurs.
(iii) Tin deposited on to copper surface, on or near reduced section, to produce 'M' effect when a prolonged overload fault occurs.

RS stock no.	Current rating (Amps)		Dimensions (BS88: 2)	Max. voltage rating		GEC reference
	Continuous	Motor surge*		ac	dc	
415-109	2	-	A1	550V	250V	NIT2
415-115	4	-	A1	550V	250V	NIT4
414-617	6	-	A1	550V	250V	NIT6
414-623	10	-	A1	550V	250V	NIT10
414-639	16	-	A1	550V	250V	NIT16
414-645	20	-	A1	550V	250V	NIT20
414-651	20	25	A1	415V	-	NIT20M25
414-667	20	32	A1	415V	-	NIT20M32
415-121	6	-	A2	660V	460V	TIA6
415-137	10	-	A2	660V	460V	TIA10
415-143	16	-	A2	660V	460V	TIA16
415-159	20	-	A2	660V	460V	TIA20
415-165	25	-	A2	660V	460V	TIA25
415-171	32	-	A2	660V	460V	TIA32
415-187	32	35	A2	660V	460V	TIA32M35
415-193	32	40	A2	660V	460V	TIA32M40
414-673	32	50	A2	660V	460V	TIA32M50
414-689	32	63	A2	660V	460V	TIA32M63
415-200	40	-	A3	660V	460V	TIS40
415-216	50	-	A3	660V	460V	TIS50
415-222	63	-	A3	660V	460V	TIS63
414-695	63	80	A3	660V	-	TIS63M80
414-702	63	100	A3	660V	-	TIS63M100
418-530	80	-	A4	660V	350V	TCP80
418-546	100	-	A4	660V	350V	TCP100
415-250	100	125	A4	660V	350V	TCP100M125
415-266	100	160	A4	660V	350V	TCP100M160
415-272	125	-	B2	660V	350V	TF125
415-288	160	-	B2	660V	350V	TF160
415-294	200	-	B2	660V	350V	TF200
415-301	200	250	B2	660V	460V	TF200M250

*For an explanation of dual rated fuselinks see 'available types and ratings' on Page 3.

Available types and ratings

The table on Page 2 lists the available types and ratings. Those shown to have a dual basis of current rating are referred to as motor rated fuselinks, however this does not imply that the standard range cannot be used for this application. The advantage gained by using motor rated types is explained later.

Standard fuselines

These have a single current rating and are used for general purpose applications. Time-current characteristics for the range are shown on Pages 9 and 10.

Motor rated fuselines

The motor rated fuselinks are shown to have a dual basis of current rating. The smaller value is the fuselink's continuous rating which is limited by its body size and its associated fuseholder. **This continuous rating must not be exceeded.** The larger value is its rating with respect to the time/current characteristics, ie. a 20M25 fuselink has the same curve as a standard 25A fuselink in the next larger body size, and is thus an indication of its ability to withstand motor starting current surges. The two ratings are separated by an 'M' in the list numbers. eg. 20M25.

In IEC 269: 1986, such dual rated fuselinks are classified as 'gM', and standard current ratings are classified as 'gG', and these references will be marked on fuselinks when the pending revision of BS88 is published.

Class 'gM' fuselinks exist only to enable economies to be achieved in the sizes of equipment where possible, eg. 32M63 fuselinks and their associated 32A fuseholders can be used in a 15kW motor circuit (28A flc) instead of standard 63A fuselinks in 63A fuseholders.

Class 'gM' types therefore complement the standard 'gG' range, and either style can be used in motor circuits dependent upon the motor ratings being considered. Page 6 gives the dimensions of all the available fuselink types.

The importance of co-ordination

Correct co-ordination between electrical control components, which when combined constitute an ac motor starter, is of the utmost importance if reliability and safe operation of plant and equipment is to be ensured.

This is particularly true in industrial applications where the control gear may be sited in the vicinity of the power source and consequently may be exposed to high prospective fault levels under short circuit conditions.

The danger to personnel, resulting from inadequate protection to electrical installations, is not unknown to the Factory Inspectorate. Recently it published a report* which highlighted problems related to main switchgear installations. Although this report did not specifically cover motor control, it highlighted a problem which can equally apply in this area, ie. inadequate systems and poor understanding of the limit of performance of the components.

The IEE wiring regulations, 15th edition, rule 435-1 states:

"The characteristics of devices for overload protection and those for short circuit protection shall be co-ordinated so that the energy let through by the short circuit protective device does not exceed that which can be withstood without damage by the overload protective device".

To this rule a note is added:

"For circuits incorporating motor starters, Regulation 435-1 **does not preclude** the type of co-ordination described in BS4941, in respect of which **the advice of the manufacturer of the starter should be sought**".

Until now, components would be recommended based on computer predictions of what might happen under fault conditions. Motor control gear manufacturers which employ computer aided design techniques, recognise that **type 'C' co-ordination cannot be shown to be achieved solely on the basis of these computer predictions.** Electrical performance parameters may be determined but the capability of some of the materials used can only be proved under actual stress conditions.

The combinations of fuse, contactor and overload relay, tabulated on Pages 7 and 8, were tested to all the requirements of BS4941, Appendix C.

The satisfactory testing and certification of these combinations will ensure peace of mind both for installer and user. It must be stressed, however, that **ASTA certification only applies to the combinations shown in the table**. Fuselinks offered as physical equivalents, even with similar list numbers, do not have the same unique time/current characteristics and hence cannot be guaranteed for type 'C' co-ordination. This being the case, a notice to this effect should be left with the equipment.

* 'Safety of electrical distribution systems on factory premises.'

HMSO Publications Centre, PO Box 276, London SW8 5DT.

Working example

The components required to make up a DOL starter, 240V 50Hz coil voltage, for a 1hp squirrel cage induction motor for 3-phase AC3 duty would be:

1 pack of 5, HBC fuselinks NIT10	414-623
3 off A1 Red Spot fuseholders	413-901
3 off DIN rail adaptors (optional)	414-213
1 off 'd' range contactor 9A-4kW	347-624
1 off 'd' range O/L relay (flc 1.6-2.5A)	347-422

Other items required (eg pushbuttons, enclosures etc.) are available - see RS Catalogue.

How co-ordination works

Figure 4 shows the time/current characteristics for a typical combination as shown in Figure 3. I_c is the nominal crossover current above which the fuselinks will operate before the associated contactor, to save the latter from damage.

To ensure that this zone was fully explored, the ASTA tests were carried out at both 0.75 and 1.25 times I_c at 110% rated voltage and at a power factor of 0.35. This was in accordance with the requirements in the British Standard. At lower fault currents, the overload relay trips causing the contactor to open before the fuse blows.

Figure 3 Direct on-line

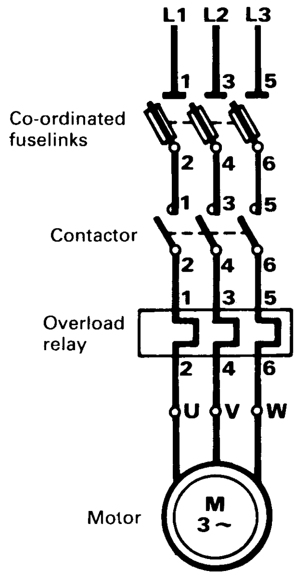
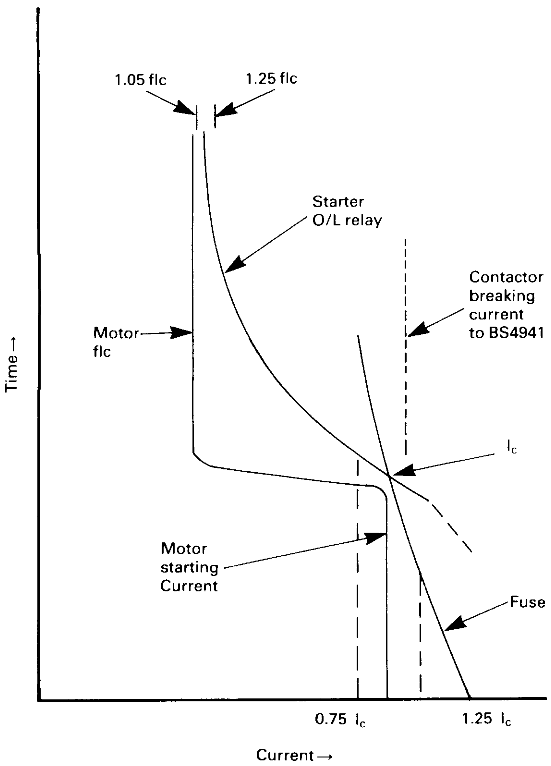


Figure 4 Time/Current characteristics



Types of co-ordination

Appendix C of BS4941:Part 1: 1979 (IEC292-1) defines three levels of co-ordination between contactor, overload relay and short circuit protection device, which give different physical results after a serious short circuit fault. They are:

Type 'A' - Any kind of damage may occur within the starter, provided its enclosure remains intact.

Type 'B' - The overload relay tripping characteristics may be permanently altered, but no other damage is permissible.

Type 'C' - No damage is allowed.

Note: For types 'B' and 'C' light welding of the contacts is acceptable provided the welds can be easily broken.

To obtain ASTA certification the combination is subjected to severe testing at 50kA, 415V then the contactor and overload relay are closely examined to ensure that no damage has occurred and that the thermal characteristics of the overload relay are unaltered.

Co-ordination when using dimensionally larger fuselinks than those certified.

GEC and Télémecanique made a conscious decision to use the smallest possible dimensional sizes of fuselink when testing the combinations detailed on Page 7.

This was done to produce maximum stress conditions, since under given fault conditions a dimensionally larger fuselink will let through slightly less energy than a dimensionally smaller one of the same current rating. Hence if some users prefer to fit dimensionally larger fuselinks (eg. A2 types instead of A1 in the smaller motor circuits) they will still achieve type 'C' co-ordination. Thus at 50kA, 415V, sizes A2 and A1 fuselinks rated 32A and 20M32 respectively would yield the following let through values:

Rating (A)	32	20M32
Total I^2t (A^2 sec)	3400	4000
Peak current (kA)	5.2	5.2

To ensure that co-ordination is achieved in such cases, the user must not depart from the recommended fuselink current rating.

Note: The foregoing does not apply to the MTE combinations since testing was done with the larger fuses.

Cable protection in motor circuits

In a motor circuit, the contactor/overload relay combination protects the associated cables against overload, and the fuses protect them against short-circuit faults. The rules governing cable short-circuit protection are given in Section 434 of IEC Publication 364 *Electrical Installations of Buildings,* and the national rules of many countries (including, in the UK, 15th Edition of IEE Wiring Regulations) follow these IEC recommendations.

In most motor circuits, the minimum size of cable needed to carry the specified motor full load current, is easily protected by the fuse rating specified for the circuit in the Co-ordination table. Only in the smaller motor circuits is it necessary to consider this subject further, and the following Table gives details:

Chosen fuse rating for motor circuit	Min. cable size to achieve short-circuit protection
A	mm^2
20, or less	1
25	1.5
32, 35	2.5
40, 50	4
63, 80	6
100, or more	Minimum sized cable to carry motor flc

Motor starting ability

Type 'C' co-ordination is achieved without any prejudice to the ability of the fuselinks to withstand the starting surges of the motors concerned. Those recommended for the combinations given on Pages 7 and 8 will withstand the following starting conditions:

Up to 1kW	5 × flc for 5 secs
1.1 to 7.5kW	6 × flc for 10 secs
11 to 75kW	7 × flc for 10 secs
Greater than 75kW	6 × flc for 15 secs

Revision of BS88: Parts 1 and 2

All the fuselinks detailed in this data sheet meet the requirement of the pending revisions of BS88: Parts 1 and 2. Therefore all the information given herein will remain valid when the standards are amended, including the recommendations concerning type 'C' co-ordination.

Protection against electric shock

To provide an adequate degree of protection against electric shock, Section 413 of the 15th Edition of the IEE Wiring Regulations for Electrical Installations requires a circuit protective device in a fixed installation to interrupt an earth fault current within five seconds. To achieve this performance there has to be maximum permitted earth loop impedance for the circuit (Z_s). Table 41A2 in the Regulations specifies values of Z_s for HBC fuse links to BS88: Part 2: 1975 which are generally higher than those permitted for mcb's. This reflects the superior performance of HBC fuse links and enables savings to be made in the size of protective conductor installed.

The following table gives values of Z_s for the fuses listed in this data sheet.

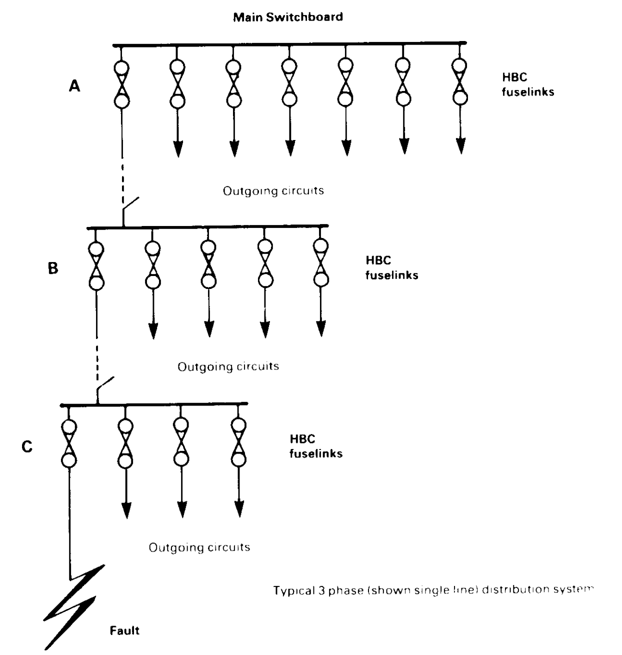
Continuous rating of fuselink (A)	6	10	16	20	25	32	40
Earth loop impedance Z_s (Ω)	13.0	7.7	4.4	3.0	2.4	1.8	1.4

Continuous rating of fuselink (A)	50	63	80	100	125	160	200
Earth loop impedance Z_s (Ω)	1.1	0.86	0.6	0.45	0.34	0.27	0.19

General purpose applications

The standard ratings of this range (class gG) can also be applied to any general purpose circuit, when the fuselink carrier rating (I_N) must not be less than the circuit full load current (I_B). When used in this way, they will protect associated pvc insulated cables against overload and short circuit currents if I_N is equal to, or less than the current rating of the cable I_z. This is in accordance with rule 433-2 of the 15th Edition of the IEE Wiring Regulations.

Discrimination between fuselinks

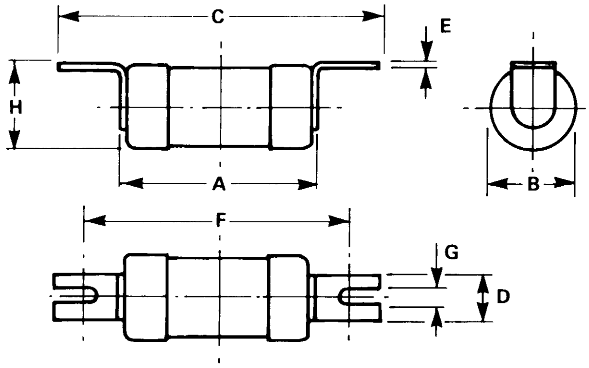


With property selected fuselinks 'minor' fuselink 'C' operates and 'major' fuselinks A and B remain unaffected

Positive discrimination under 'short circuit' conditions is achieved when the larger or 'major' fuselink is unaffected by the fault current which causes the smaller or 'minor' fuselink to operate. The total operating I^2t let through by the 'minor' fuselink must therefore be less than the pre-arcing I^2t of the 'major' fuselink. I^2t characteristics for type 'T' fuselinks are given on Page 13. They are derived from tests taken under maximum arc energy conditions and can be used to assess discrimination at 415V, 550V or 660V. For 415V applications a ratio of 2:1 between 'major' and 'minor' fuselinks will ensure discrimination at all fault levels, but the characteristics can be used to assess discrimination where it is necessary to resort to the use of a smaller ratio to overcome a particular problem. At 550V and 660V, it may not always be possible to assume a general discrimination ratio of 2:1 if large fault levels are encountered. In such cases the I^2t characteristics must be used to achieve a satisfactorily graded installation.

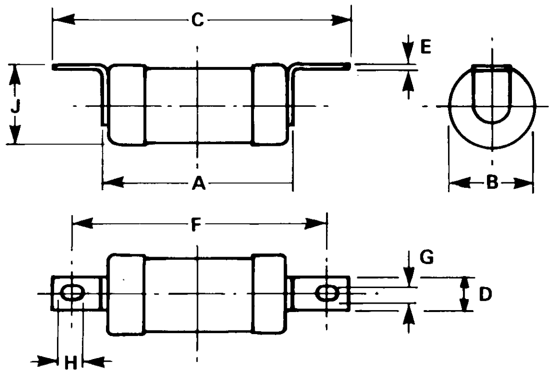
Dimensions of BS88-2 fuselinks for use in type ‘c’ co-ordinated motor circuits

Figure 5



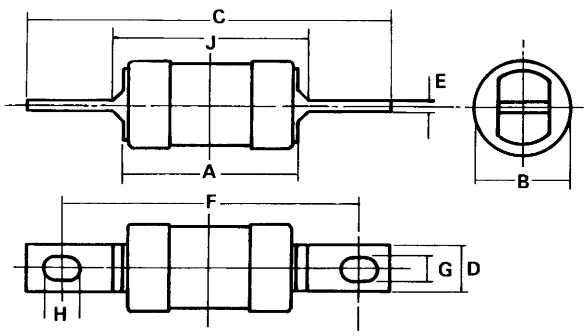
BS88-2 dimensional reference	Fuselink current ratings (A)	Figure number	Dimensions							
			A	B	C	D	E	F*	G	H
A1	All ratings up to 20M32	3	36.5	13.9	55.6	11.1	0.8	44.5	4.7	14.3

Figure 6



			A	B	C	D	E	F*	G	H	J
A2	All ratings up to 32M63	4	56.4	23.8	85.8	8.7	1.2	73.0	5.22	7.1	23.8
A3	All ratings up to 63A	4	56.4	23.8	85.8	8.7	1.2	73.0	5.2	7.1	23.8
A3	63M80 and 63M100	4	58.0	26.2	90.5	12.7	1.2	73.0	5.2	7.1	27.8
A4	All ratings up to 100M160	4	70.0	34.9	111.0	19.1	2.4	93.7	8.7	10.3	34.9

Figure 7



			A	B	C	D	E	F*	G	H	J
B2	All ratings up to 200A	5	70.0	34.9	136.5	19.1	3.2	111.0	8.7	11.9	79.4
B2	200M250	5	70.0	41.3	136.5	19.1	3.2	11.0	8.7	11.9	79.4

Co-ordination table (GEC/Télémecanique 'd' range combinations)

Note	Standard motor ratings† AC3 duty at 415Vac			Co-ordinated components for a DOL starter							Minimum electrical safety clearance	BS88 HBC fuselink for other starting methods*
				BS88 HBC fuselink	'd' range contactor range				'd' range O/L relay			
	kW	hp	A		24V coil	110V coil	240V coil	415V coil	Stock no.	flc range		
2	0.37	0.5	1.05	415-115	343-240	347-618	347-624	347-602	347-438	1.0-1.6A	10mm	415-109
1	0.55	0.75	1.5	414-617	343-240	347-618	347-624	347-602	347-438	1.0-1.6A	10mm	415-115
1	0.75	1	2	414-623	343-240	347-618	347-624	347-602	347-422	1.6-2.5A	10mm	415-115
2	1.1	1.5	2.5	414-623	343-240	347-618	347-624	347-602	347-422	1.6-2.5A	10mm	414-617
1	1.5	2	3.5	414-639	343-240	347-618	347-624	347-602	347-416	2.5-4.0A	10mm	414-623
1	2.2	3	5	414-639	343-240	347-618	347-624	347-602	347-400	4.0-6.0A	10mm	414-623
1	3.0	4	6.5	414-645	343-240	347-618	347-624	347-602	347-393	5.5-8.0A	10mm	414-639
1	4.0	5.5	8.4	414-645	343-240	343-618	347-624	347-602	347-387	7.0-10A	10mm	414-639
1	5.5	7.5	11	414-651	343-256	347-589	347-595	347-573	347-371	10-13A	10mm	414-645
1	7.5	10	14	414-667	343-262	345-454	345-460	345-476	347-365	13-18A	10mm	414-651
1	11	15	21	414-673	343-278	347-523	347-539	347-517	347-359	18-25A	10mm	415-171
1	15	20	28	414-689	343-284	345-482	345-498	347-505	347-511	13-32A	10mm	415-187
1	22	30	40	414-695	343-290	347-494	347-501	347-488	347-321	38-50A	12mm	415-222
1	30	40	55	414-702	343-307	347-466	347-472	347-450	347-315	48-57A	12mm	414-695

† These values are given as a guide. They may vary depending on the type of motor and manufacturer.
* Combinations of fuselink, contactor and overload relay have **not** been ASTA tested for other starting methods. The listed fuselinks are in accordance with the manufacturer's recommendations.
1 = ASTA certified combination for type 'c' co-ordination to BS4941 at 50kA, 415V.
2 = Combination deemed capable of type 'c' co-ordination since it employs the same components as an ASTA certified combination, with only the flc setting on the overload relay adjusted to suit the motor.

Other starting methods

Figure 8 **Star delta**

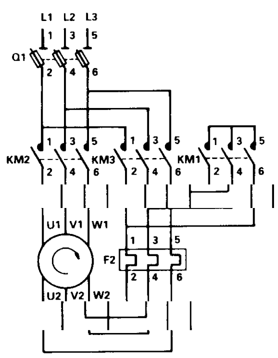
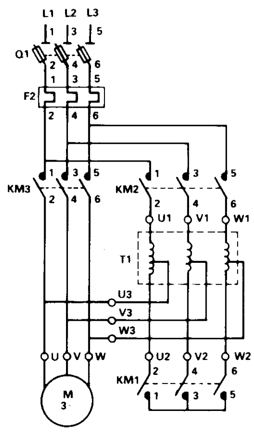


Figure 9 **Auto-transformer**



Co-ordination table (GEC/Télémecanique 'd2' range combinations)

Standard motor ratings† AC3 duty at 415Vac			Co-ordinated components for a DOL starter							Minimum electrical safety clearance	BS88 HBC fuselink for other starting methods*
			BS88 HBC fuselink	'd2' range contactor				'd' range O/L relay			
kW	hp	A		24V coil	110V coil	240V coil	415V coil	Stock no.	flc range		
0.37	0.5	1.05	415-115	314-551	314-567	314-573	314-589	314-933	1.0-1.6A	10mm	415-109
0.55	0.75	1.5	414-617	314-551	314-567	314-573	314-589	314-933	1.0-1.6A	10mm	415-115
0.75	1	2	414-623	314-551	314-567	314-573	314-589	314-949	1.6-2.5A	10mm	415-115
1.1	1.5	2.5	414-623	314-551	314-567	314-573	314-589	314-949	1.6-2.5A	10mm	414-617
1.5	2	3.5	414-639	314-551	314-567	314-573	314-589	314-955	2.3-4.0A	10mm	414-623
2.2	3	5	414-639	314-551	314-567	314-573	314-589	314-961	4.0-6.0A	10mm	414-623
3.0	4	6.5	414-645	314-551	314-567	314-573	314-589	314-977	5.5-8.0A	10mm	414-639
4.0	5.5	8.4	414-645	314-551	314-567	314-573	314-589	314-983	7.0-10A	10mm	414-639
5.5	7.5	11	414-651	314-595	314-602	314-618	314-624	314-999	9.0-13A	10mm	414-645
7.5	10	14	414-667	314-630	314-646	314-652	314-668	315-009	12-18A	10mm	414-651
11	15	21	414-673	314-674	314-680	314-696	314-703	315-015	17-25A	10mm	415-171
15	20	28	414-689	314-719	314-725	314-731	314-747	315-021	23-32A	10mm	415-187
22	30	40	414-695	314-753	314-769	314-775	314-781	315-043	30-40A	12mm	415-222
30	40	55	414-702	314-832	314-848	314-854	314-860	315-065	48-65A	12mm	414-695

† These values are given as a guide. They may vary depending on the type of motor and manufacturer.
* Combinations of fuselink, contactor and overload relay have **not** been ASTA tested for other starting methods. The listed fuselinks are in accordance with the manufacturer's recommendations.

Figure 10 Primary resistance

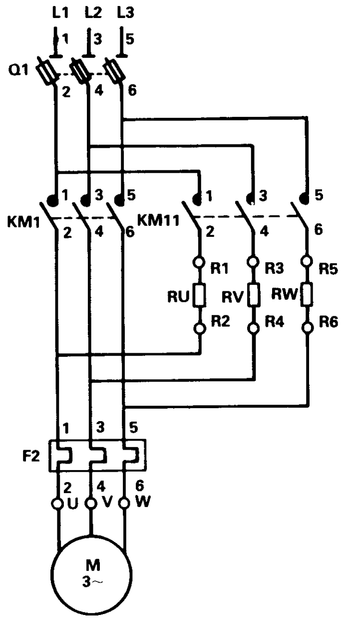
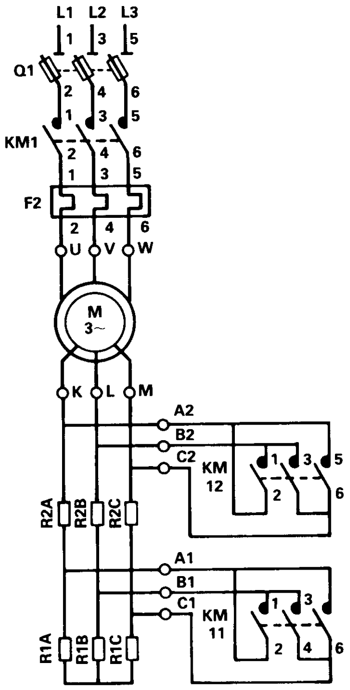


Figure 11 Slipring rotor starting



Co-ordination table (GEC/MTE MAX0 and AXC ranges)

Note	Standard motor ratings† AC3 duty at 415Vac			Co-ordinated components for a DOL starter							Minimum electrical safety clearance	Recommended BS88 fuselink for other starting methods (see note 5)
				BS88 HBC fuselink	MTE contactor range				AXTO O/L relay			
	kW	hp	A			110V coil	240V coil	415V coil	Stock no.	flc range		
2	0.37	0.5	1.05	415-115	MAX01	343-650	343-666	343-672	344-956	0.72-1.1A	10mm	415-109
2	0.55	0.75	1.5	415-121	MAX01	343-650	343-666	343-672	344-962	1.1-1.6A	10mm	415-115
2	0.75	1	2	415-121	MAX01	343-650	343-666	343-672	344-978	1.6-2.4A	10mm	415-115
2	1.1	1.5	2.5	415-137	MAX01	343-650	343-666	343-672	344-978	1.6-2.4A	10mm	414-617
2	1.5	2	3.5	415-143	MAX01	343-650	343-666	343-672	344-984	2.4-3.5A	10mm	414-623
2	2.2	3	5	415-143	MAX01	343-650	343-666	343-672	344-990	3.5-5.4A	10mm	414-623
1	3.0	4	6.5	415-159	MAX01	343-650	343-666	343-672	343-004	5.4-8.0A	10mm	414-639
1	4.0	5.5	8.4	415-165	MAX02	343-688	343-694	343-701	343-010	8.0-12A	10mm	414-639
1	5.5	7.5	11	415-171	MAX03	343-717	343-723	343-739	343-010	8.0-12A	10mm	414-645
1	7.5	10	14	415-187	MAX04	344-899	344-906	343-912	343-026	12-18A	10mm	414-651
3	11	15	21	415-216	MAX05	343-745	343-751	343-767	Use electronic Motor protection relay + CTs (see note 3)		10mm	415-171
2	15	20	28	415-222	AXC2	343-048	+ appropriate coil (see note 4)				10mm	415-187
3	18.5	25	36	415-238	AXC2	343-048					12mm	415-193
3	22	30	40	415-238	AXC3	343-852					12mm	415-222
3	30	40	55	415-244	AXC4	343-054					12mm	414-645

† These values are given as a guide. They may vary depending on the type of motor and manufacturer.

Notes

1 Co-ordination testing and certification have been carried out at maximum Type 'c' kW rating for each size of contactor.

2 Extrapolated overload relay and fuse sizes for low kW ratings included in table but **no test certificates exist.**

3 Testing and certification as per note D have been completed using thermal overload devices (AXTO/1 series). The electronic motor protection relay (**RS** stock no. 345-448) + suitable CTs (**RS** stock no. 346-277 flc=28A, **RS** stock no. 346-283 flc=36-55A) may be used for these larger motor ratings since it would be unharmed by a short circuit fault.

4 These contactors are supplied without a coil. The coil is common to all three contactor ratings and is selected according to the required control voltage. Fitting the coil is a simple task. Coil voltages available are:

Control voltage (50Hz)	**RS** stock no.
105-115V	343-060
220-240V	343-076
400-440V	343-082

5. Type 'c' co-ordination tests have not been done for 'assisted start' combinations. The listed fuselinks are in accordance with the manufacturer's recommendations. See Page 7 and this page for diagrams of other starting methods.

Figure 12 Time/Current characteristics type NIT 2-20 Amp

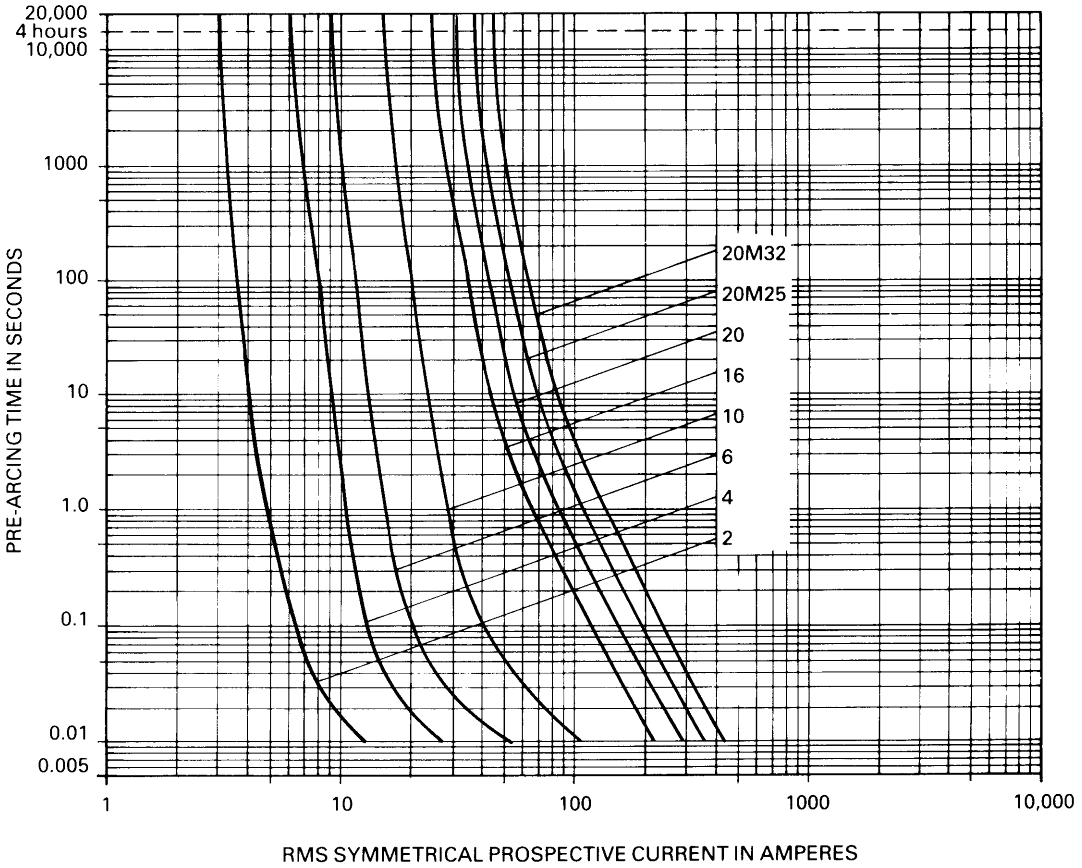


Figure 13 Time/Current characteristics type T 6-63 Amp

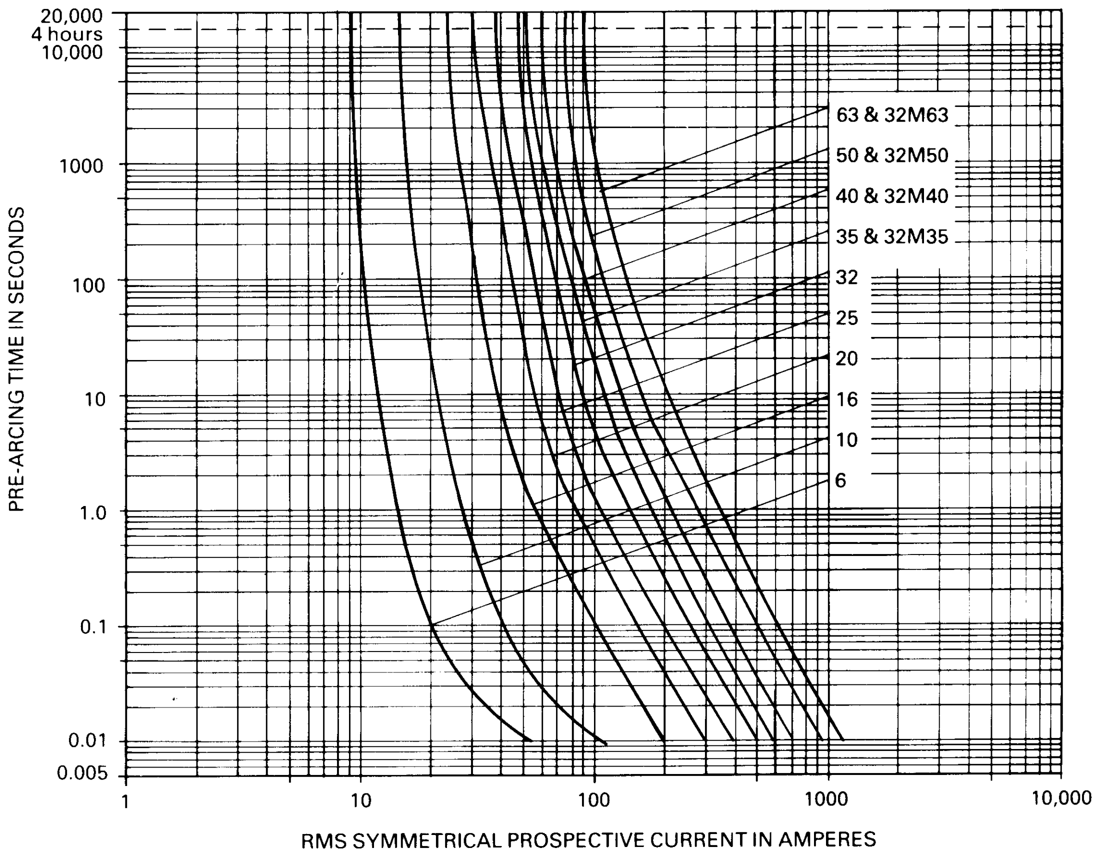


Figure 14 Time/Current characteristics type T 80-200M250 Amps

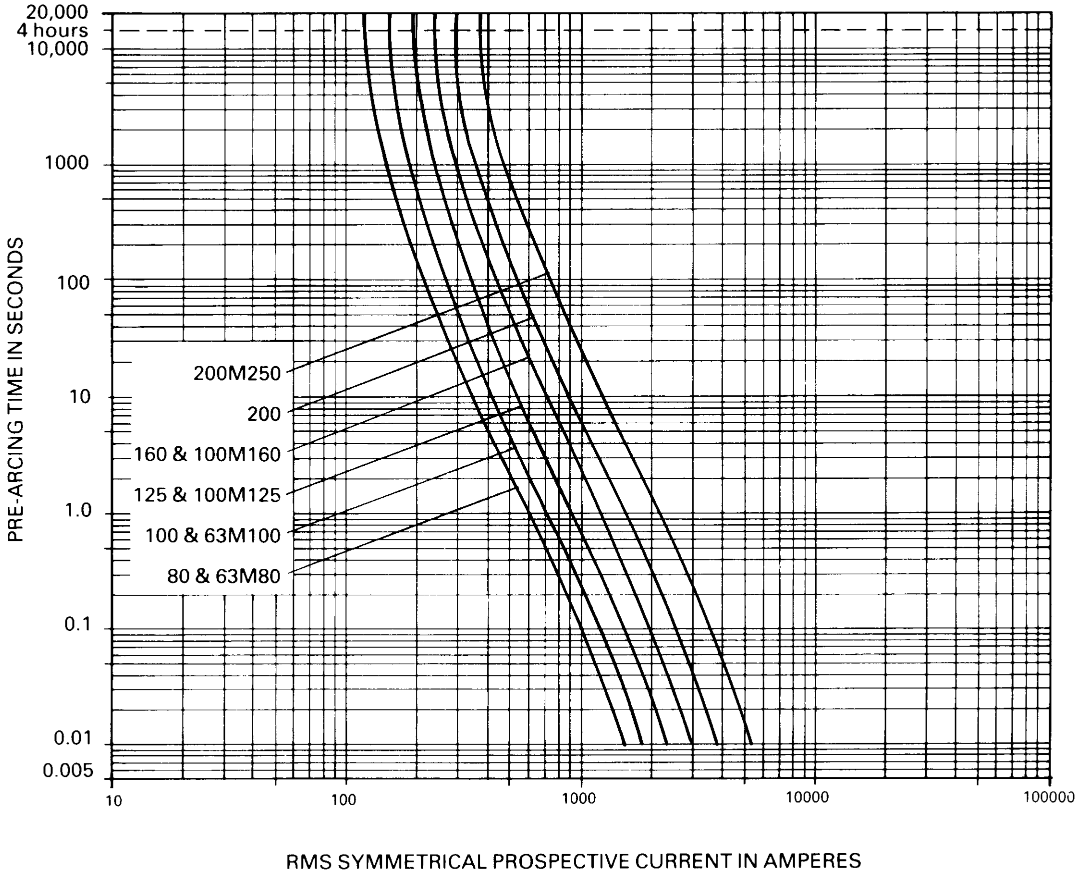


Figure 15 Cut-off current type NIT 2-20M32 Amps

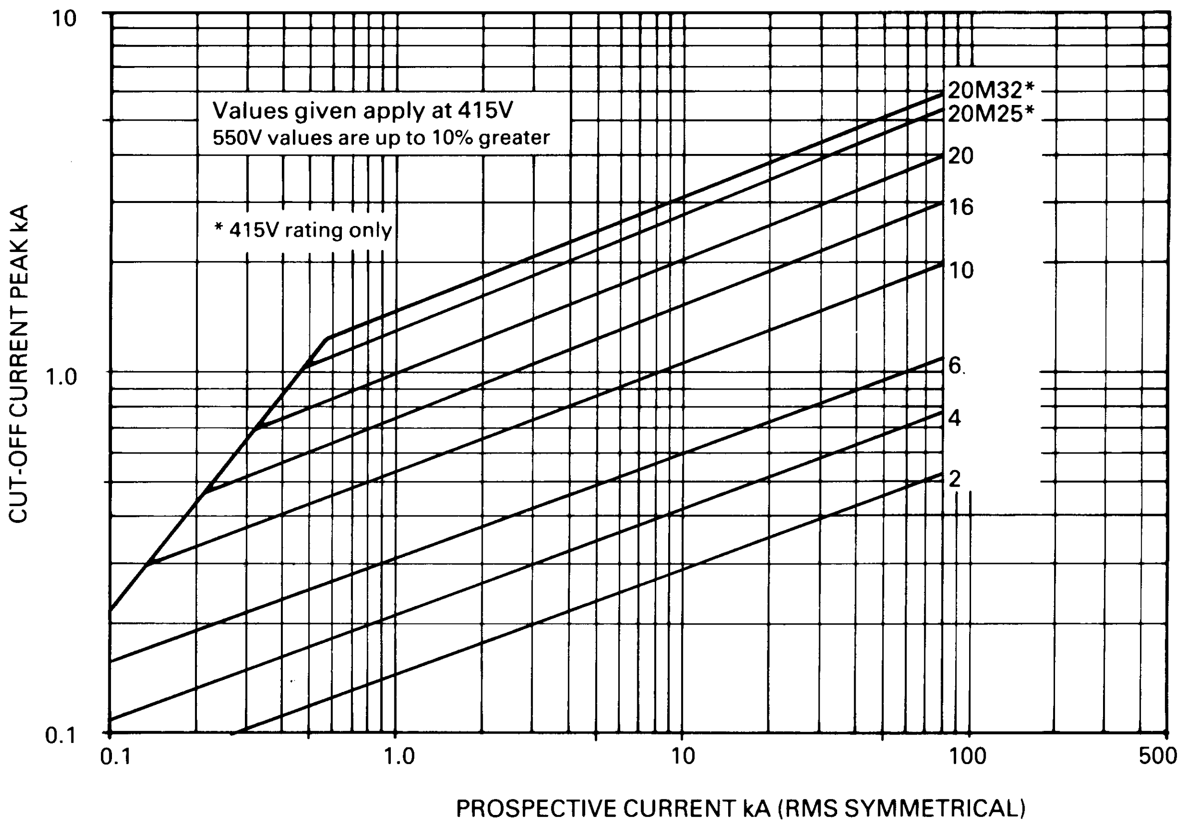


Figure 16A Cut-off current characteristics type T 6-200 Amps

To aid reference, alternate ratings have been shown on figures A & B

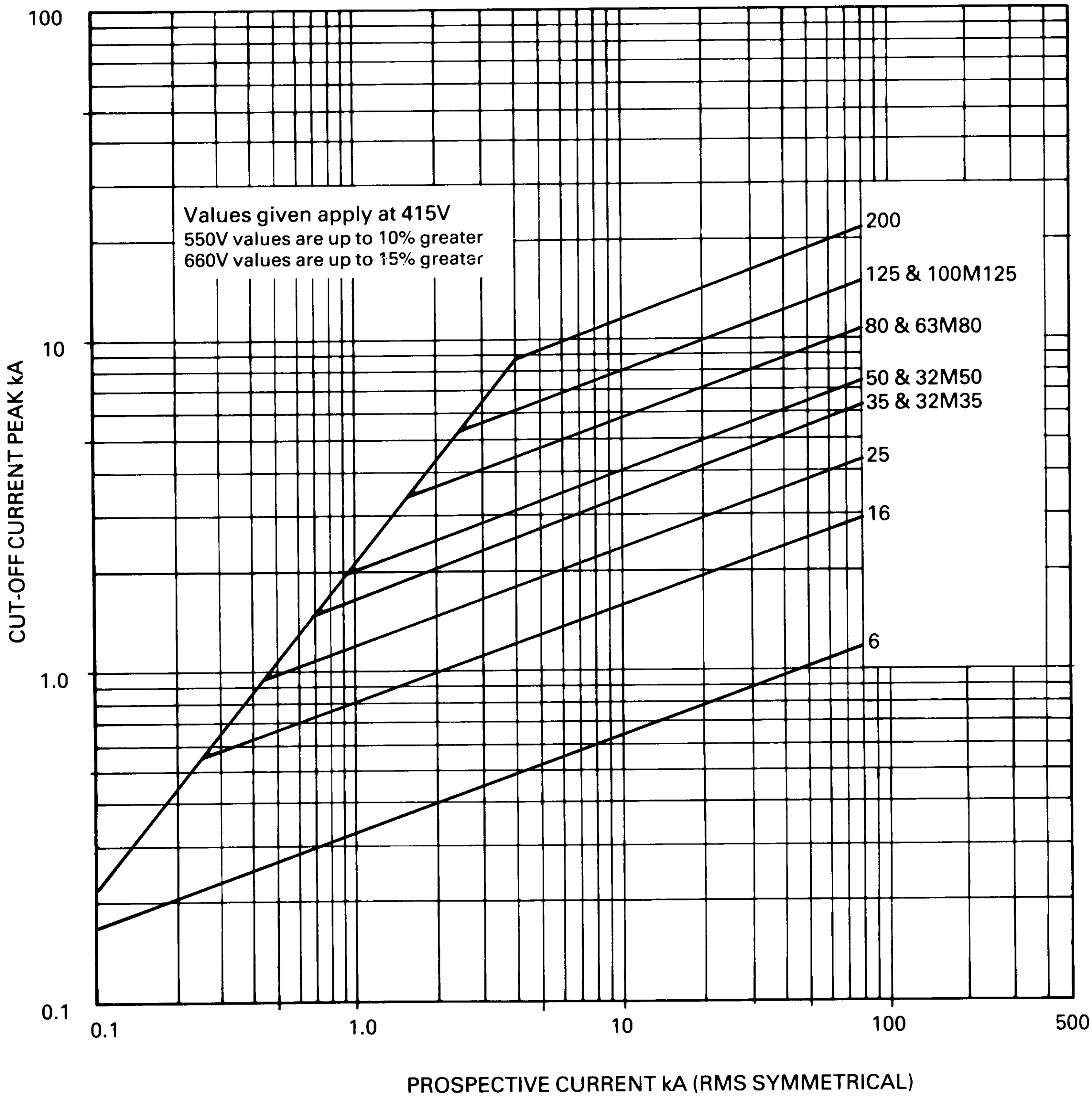


Figure 16B Cut-off current characteristics type T 10-200M250 Amps

To aid reference, alternate ratings have been shown on figures A & B

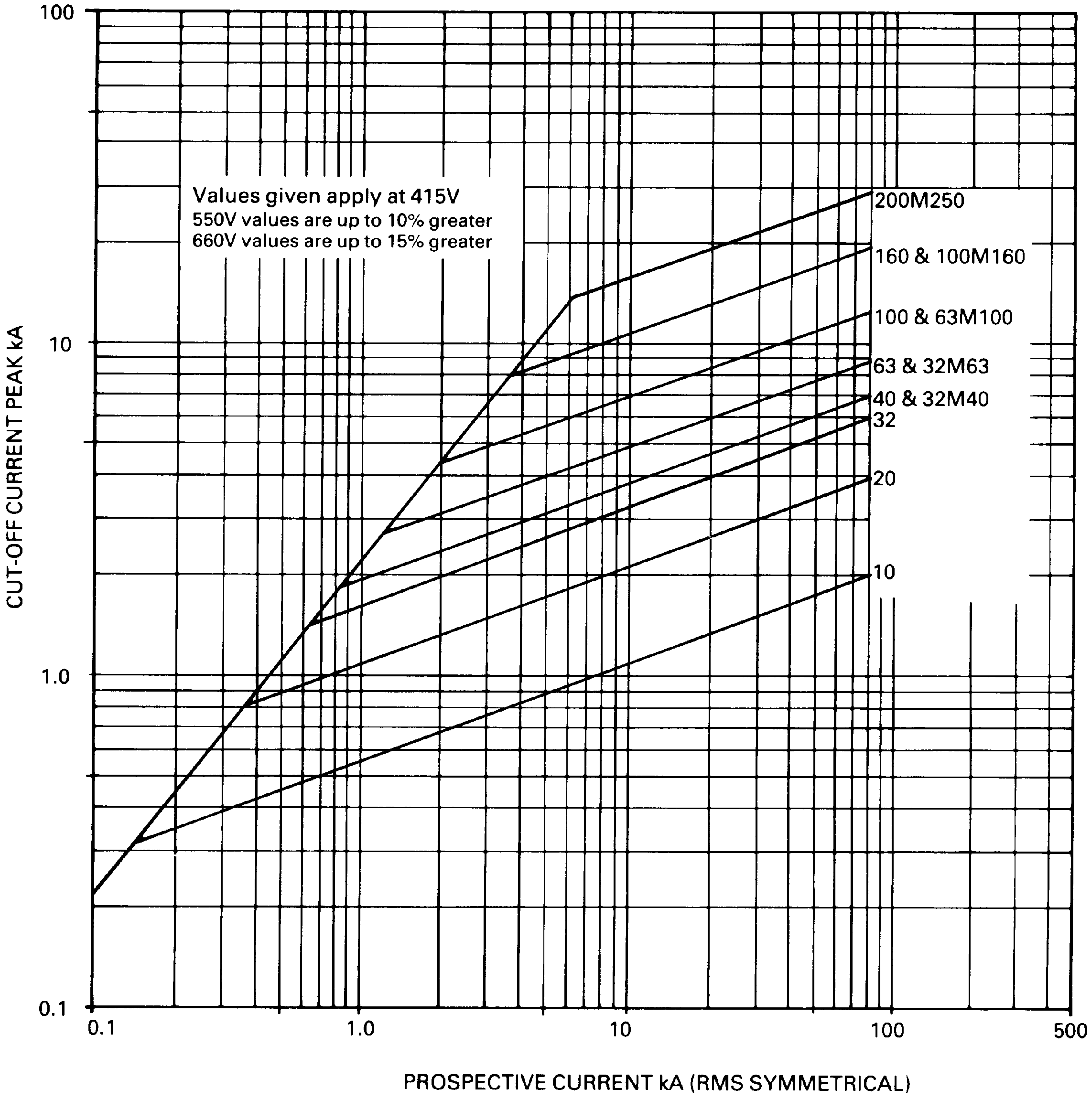


Figure 17 I^2T characteristics type NIT 2-20M32 Amps

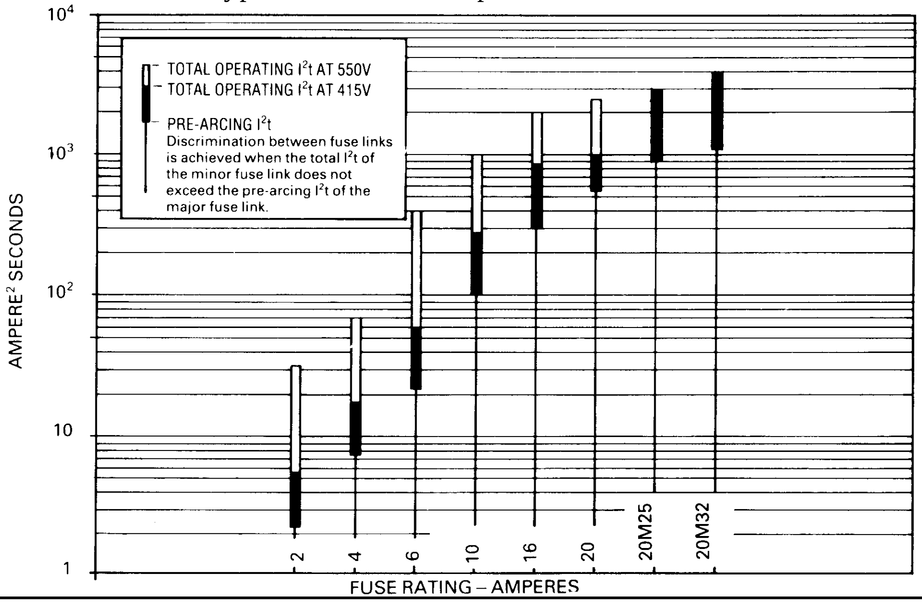
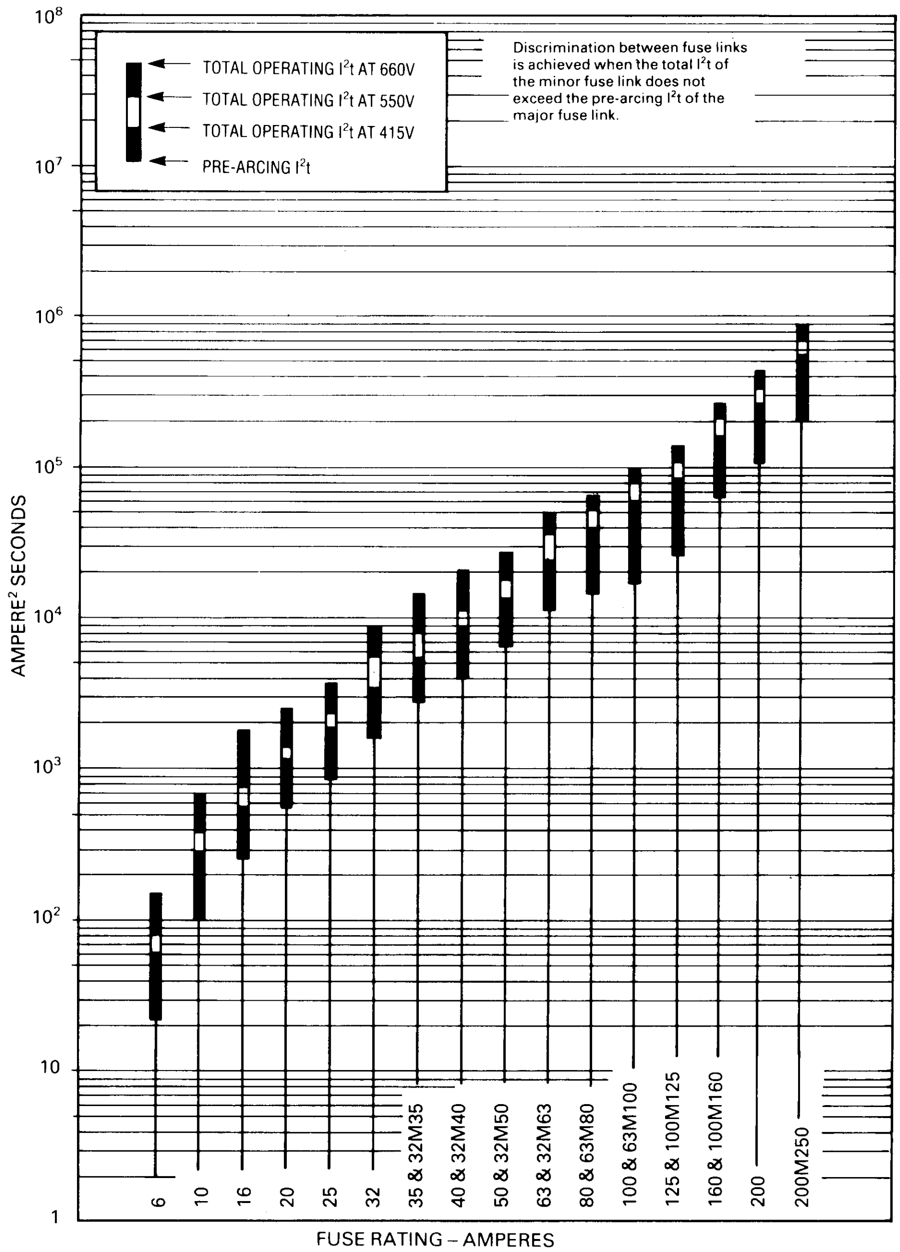


Figure 18 I^2T characteristics type T 6-200M250 Amps

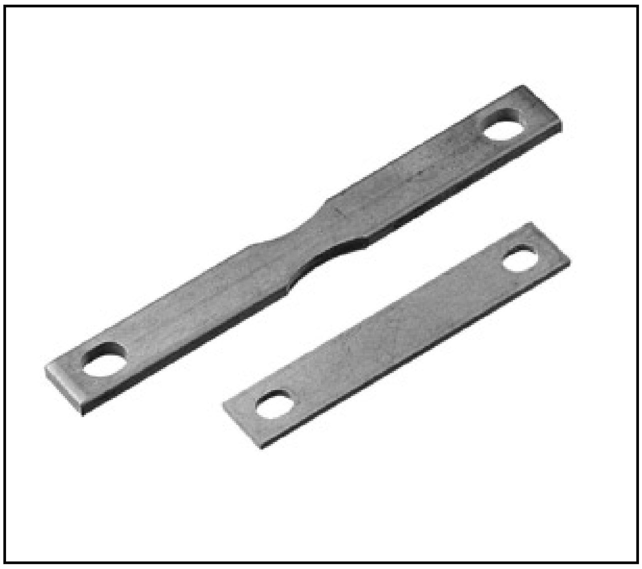


Fuseholders for BS88 fuselinks (including accessories)

The Redspot range of fuseholders is available to accommodate the fuselinks detailed in this data sheet. White versions are included for use with solid links or for identifying dc circuits etc.

Fuselink size	GEC type	Maximum current	Available colours	
			Black	White
A1	RS20H	20A	413-901	415-064
A2	RS32H	32A	413-917	415-070
A3	RS63H	63A	413-923	415-086
A4	RS100H	100A	413-939	-
B2	RS200H	200A	415-092	-

Solid links



Solid links are available for use as neutral links etc. Size 1 may be used in the A1 fuseholder, size 2 may be used in either the A2 or the A3 fuseholder. It is recommended that the white version should be chosen for this application.

Padlockable insert

A range of inserts is available for use with the red spot fuseholders so that the fuseholder can be blocked off while maintenance is carried out.

RS stock no.	GEC type	Current rating (A)	To fit fuseholder top
418-631	RS20 lock	20	RS20H
418-647	RS32 lock	32	RS32H
418-653	RS63 lock	63	RS63H
418-669	RS100 lock	100	RS100H

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