

London Underground - 'Section 12' approved Fuse Combination Range

Introduction

Following the Kings Cross fire of 1987, the resulting Fennell enquiry prompted the introduction of additional fire precautions for 'Sub-surface Railway Stations'. These additional requirements were introduced under section 12 of the Fire Precautions Act 1971, and since then have been known simply as *Section 12 regs*. There are at present around 120 London Underground stations that come under Section 12 requirements.

The forensic report on the fire sited several instances of a 'flash over' effect caused by materials and paint finishes being ignitable. Exacerbating the conditions underground were toxic fumes given off by certain materials being excessively heated.

Although the new regulations dealt with all aspects of fire prevention such as the removal of wooden escalators, the installation of heat detectors, improved staff training etc, as far as actual equipment supplied for underground use, the overriding emphasis was on materials and paint finishes.

With this isolation range, the overall consideration has been to meet, and where possible exceed, the Section 12 requirements. This has been achieved by the careful selection of individual component materials and the use of only recognised and approved paint finishes.

Applicable Regulations/Specifications

- Section 12 of the Fire Precautions Act 1971
- The Fire Precautions (Sub-surface Railway Stations) Regulations 1989
- BS EN 60947-3 Low voltage switchgear and controlgear. Switches, disconnectors, switch-disconnectors and fuse-combination units.
- BS 88-2.2:1988 Cartridge fuses for voltages up to and including 1000 V a.c. and 1500 V d.c.
- BS EN 60439-1 Low -voltage switchgear and controlgear assemblies.
- BS EN 60529 Degrees of protection provided by enclosures (IP code)
- 2-01001-002 A1 Fire safety performance of materials.
- * M-1042-A2 Fire safety of materials used in the Underground.
- 2-1105-006 Low voltage electrical installations.
- * E 4013 General requirements for fixed installation power supplies.

Equipment Description

Fuse Combination assemblies in the range 32A - 400A are all supplied housed in one of four sizes of sheet steel enclosures. The interior assemblies are supplied as three phase with a switched neutral. Each phase is designed to accept 'bolted tag' BS 88 cartridge fuses, whilst the neutral is fitted with a removable solid link.

The all metal operating handles are supplied in two sizes across the range, and are lockable in the 'Off' position as standard, with an option to enable locking in the 'On' position.

The IP65 sealed enclosures are generously proportioned to allow simple cable connection, with removable gland plates on both top and bottom faces.

All external surfaces are finished with a 'Cupon EA9' approved paint system. Enclosures are finished red or grey and handle assemblies red.

Catalogue Numbers

Rating	Catalogue Number		Enclosure Size*
	Finished Grey	Finished Red	
32A	SFDCG0323LUL	SFDCR0323LUL	2
63A	SFDCG0633LUL	SFDCR0633LUL	2
100A	SFDCG1003LUL	SFDCR1003LUL	2
160A	SFDCG1603LUL/COM	SFDCR1603LUL/COM	2A
200A	SFDCG2003LUL/COM	SFDCR2003LUL/COM	2A
250A	SFDCG2503LUL	SFDCR2503LUL	3
315A	SFDCG3153LUL	SFDCR3153LUL	4
400A	SFDCG4003LUL	SFDCR4003LUL	4
630A	SFDCG6303LUL	-	5

*See page 2

To call for padlocking in both 'Off' & 'On' positions, add suffix '10' to the catalogue numbers as shown above. - e.g. SFDCR2003LUL10



Typical interior assembly showing BS88 type fuse links



Locking system allows several individual padlocks to be inserted



Typical Assembly with a grey Copon finished enclosure

T e c h n i c a l D a t a S h e e t

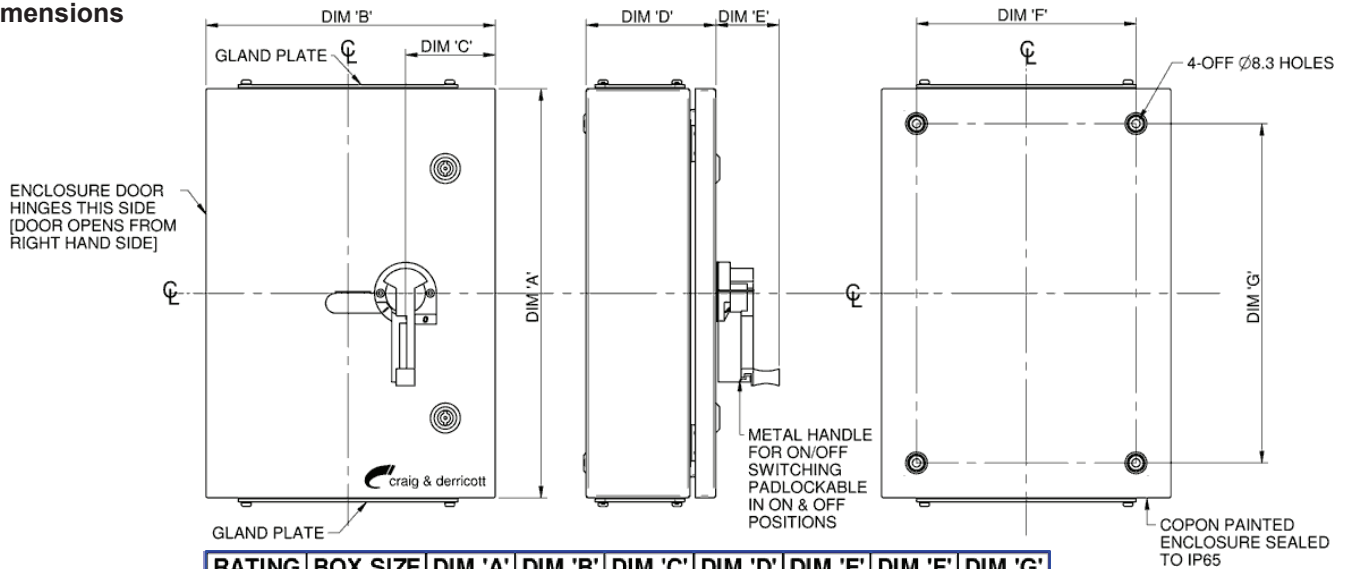
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Technical Specification (To BS EN 60974 - 3)

Application	Sym.	Unit	Category	Rating (A)								
				32	63	100	160	200	250	315	400	630
Rated thermal current	I_{th}	A		32	63	100	160	200	250	315	400	630
Rated insulation voltage	U_i	V		800	750	750	750	750	750	800	800	1000
Fuse-link style		A	BS88 Type Ref	A1	A2-A3	A4	A3-A4	B1-B2	B1-B2	B1-B4	B1-B4	C1-C2/3
Rated impulse voltage	U_{imp}	kV		8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	12
Rated operational current (AC)	I_e	A	400V - AC22A/AC22B	32/32	63/63	100/100	160/160	200/200	250/250	315/315	400/400	630/630
			400V - AC23A/AC23B	32/32	63/63	100/100	160/160	200/200	250/250	315/315	400/400	630/630
			690V - AC22A/AC22B	32/32	63/63	100/100*	160/160*	160/160*	250/250*	315/315*	315/400	500/630
			690V - AC23A/AC23B	32/32	63/63	100/100*	125/125*	125/125*	250/250*	250/315*	250/315	314/400
Rated operational power	P_e	kW	3x400V - AC23A	15	30	51	80	100	132	160	220	355
			3x690V - AC23A	25	55	90	110	150	220	220	220	295
Fuse protected short-circuit characteristics		kA (rms)	Prospective short-circuit current	80	80	80	50	80	80	80	80	80
		A	Associated fuse rating	32	63	100	160	200	250	315	400	630
Overload capacity		kA (Peak)	Fuse switch cut-off current	9.0	10.6	20.0	20.0	32.5	32.5	40.0	40.0	70.0
Mechanical endurance			Cycles	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	8,000
Connecting capacity			Terminal type									
		mm ²	Cable section (Min/Max)	6/25	10/25	25/95	35/95	95/240	95/240	185/240	185/240	2 x 150 2 x 300
		mm	Maximum busbar width	-	-	20	20	32	32	45	45	63
		Nm	Min. Tightening torque	6	6	9	9	20	20	20	20	40

*With terminal shrouds or terminal screen

Dimensions



RATING	BOX SIZE	DIM 'A'	DIM 'B'	DIM 'C'	DIM 'D'	DIM 'E'	DIM 'F'	DIM 'G'
32A	2	410	290	91	190	64	220	340
63A	2	410	290	91	190	64	220	340
100A	2	410	290	91	190	80	220	340
160A	2A	550	300	91	190	80	230	480
200A	2A	550	300	91	190	80	230	480
250A	3	630	460	110	330	80	390	560
315A	4	760	550	140	380	80	480	690
400A	4	760	550	140	380	80	480	690
630A	5	900	580	115	390	80	510	830