Arc Fault Detection Devices

18th Edition - We're ready

ARC FAULT DETECTION DEVICES & THE WIRING REGULATIONS

The 18th edition wiring regulations (BS7671) sets out requirements for electrical installations in the UK, including requirements for protection of persons, livestock & property against the risk from fires that may be generated & propagated in electrical installations.

Designers & installers are required to ensure that installations are arranged so that the risk of ignition from high temperatures or electric arc is minimised, and protection from harmful thermal effects is provided during normal operation and under fault conditions. Protection requirements include protecting against fire caused by insulation faults, arcs & sparks & high temperatures (1).

Installing arc fault detection devices is recognised in the 18th Edition of the wiring regulations as a means of mitigating the risk from fire in final AC circuits due to arc faults.

MCBs & RCDs & THE SAFETY GAP

Although the wiring regulations permit the use of RCDs as a measure for protection against insulation faults, & require the use of other circuit protection devices such as MCBs to provide protection against short circuit & overcurrent conditions etc, those devices cannot detect or disconnect arc faults. Neither of those devices is capable of detecting serial arc faults, and parallel arc faults will go unnoticed due to the fact that the magnitude of an arc fault is insufficient to operate an RCD or MCB.

COMBINED TECHNOLOGY - AFDD, MCB & RCBO

In order to provide for all of the above requirements Wylex AFDDs are combined with Miniature RCBOs as a single protective device that includes overcurrent protection, short circuit fault protection, earth leakage protection, and arc fault protection, with two pole isolation as standard.

Wylex combined technology AFDDs provide for the requirements of BS7671 including additional protection against fires caused by arcs. Closing the safety gap & providing additional safety measures.

(1) Requirements in BS7671 can be found in Chapters 13 (Protection For Safety) and Chapter 42 (Protection Against Thermal Effects) other chapters are also be applicable. Readers should refer to BS7671 for full details.

BS 7671 WIRING REGULATIONS 18th EDITION

DEFINITIONS	**DANGER** Risk of injury to persons from: fire, electric shock, burns, arcing and explosion arising from the use of electrical energy
CHAPTER 13	**PROTECTION FOR SAFETY** The requirements are to provide for the safety of persons, livestock and property against dangers that may arise from reasonable use of electrical installations including risks of injury from: shock currents excessive temperatures likely to cause burns, fires and other injurious effects arcing or burning, likely to cause blinding effects, excessive pressure and/or toxic gas
CHAPTER 13	**PROTECTION FOR SAFETY - THERMAL EFFECTS** Installations should be arranged so that the risk of ignition of flammable materials due to high temperature or electric arc is minimized and risk of burns should be minimal.
CHAPTER 42	**PROTECTION AGAINST FIRE CAUSED BY ELECTRICAL EQUIPMENT** Requires people livestock and property to be protected against harmful effects of heat or fire that may be generated or propagated in electrical installations. Harmful effects from heat or fire may be caused by insulation faults, arcs, sparks and high temperature particles
CHAPTER 42	**PROTECTION AGAINST THERMAL EFFECTS** Electrical equipment shall be so selected and erected that its normal temperature rise and foreseeable temperature rise during a fault cannot cause a fire. This shall be achieved by the construction of the equipment or by additional protective measures taken during erection of installation
CHAPTER 42	**PROTECTION AGAINST THERMAL EFFECTS** Arc Fault Detection Devices are recommended as a means of providing additional protection against fire caused by arc faults in AC final circuits e.g. in buildings with sleeping accommodation, in places with a risk of fire involving stored or processed materials, wooden/combustible buildings, fire propagating structures and premises with endangered or irreplaceable items
CHAPTER 53	**DEVICES FOR THE PROTECTION AGAINST THE RISK OF FIRE** Where specified. Arc fault detection devices shall be installed at the origin of the final circuits to be protected, and in AC single phase circuits not exceeding 230V. Arc fault detection devices shall comply with BS EN 62606

For reference - 131.1, 131.3.1, 131.3.2, 420.1, 421.1.1, 422.1.2, 421.1.7, 522.6.1, 522.6.2, 526.1, 532.1, 532.6, Appendix 6 schedule of inspections & schedule of test results. Not exhaustive, other requirements may also apply.

ELECTRICAL FIRES

Government statistics for 2016/17 show a high number of incidents where the source of ignition is recorded as electrical distribution or electrical appliance, these two categories amount to more than 13,000 fires in total [(2)]

Year	Total	Electrical distribution	Other electrical appliances	Combined total
2014/15	71,116	7,812	5,834	13,646
2015/16	73,477	7,719	5,634	13,353
2016/17	74,803	7,822	5,525	13,347

(2) Government statistics for England, fire statistics table / data sets

AFDD EXPERIENCE

Arc Fault Detection Devices (AFDDs) have been proven to reduce the number of incidents of electrical fires in countries where these devices are used. AFDDs detect & automatically disconnect arc faults that occur in damaged or crushed cables, in loose terminations, and in ageing installations where the insulation quality degrades over time.

Arc faults cause overheating and the temperatures that are generated from such overheating can be high enough to ignite flammable materials and cause fires. AFDDs monitor the condition of a circuit for unusual conditions that are indicative of a series or parallel arc. These arc fault conditions can occur in electrical installation circuits and in cords & leads and in equipment / appliances connected to those circuits. AFDDs detect arc fault conditions & automatically disconnect the power to the circuit with an arc fault. With the government statistics revealing so many fires involving electrical distribution & appliances the use of AFDDs on final A.C. circuits would address some of these issues, including those associated with cords & leads.

ARC FAULT DETECTION DEVICES (AFDDs)

Arc fault detection devices offer extremely effective protection against fires that are started by electrical faults. Typical causes include loose connections, damaged cables, crushed cables or where aged insulation allows current to leak between conductors.

AFDDs detect electrical arcing faults that MCBs, RCDs and RCBOs cannot detect.

Types of Arc Fault:

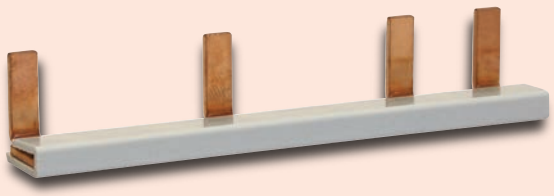
Serial arcing faults:
These are typically caused by a loose connection or a damaged conductor. In this arc fault condition current flow is always lower than the operational load current. Miniature Circuit Breakers and Residual Current protective devices will not detect these electrical faults.

Parallel arcing faults between conductors:
These are caused by electric arcs resulting from damage to the insulation that permits minimum contact between the two live conductors. MCBs or RCBOs may trip if the fault current is high enough. However AFDDs are extremely sensitive and will disconnect parallel arcing faults from 2.5A

Parallel arcing faults between phase or neutral/protective conductor:
AFDDs will detect arcing faults against the protective conductor and provide adequate fire protection where no RCD is used. However Wylex AFDDs are combined with 30mA Miniature RCBOs that reliably detect and shut down this type of parallel arc fault.

AFDD with Miniature RCBO provides the highest levels of protection for the installation and its users.

AFDDs & Consumer Unit Busbars



COMBINED RCBO AFDD

B CURVE	C CURVE	CURRENT RATING	RCD RATING	POLES	MODULES
NHXSB06AFD	NHXSC06AFD	6A	30mA	2	2
NHXSB10AFD	NHXSC10AFD	10A	30mA	2	2
NHXSB16AFD	NHXSC16AFD	16A	30mA	2	2
NHXSB20AFD	NHXSC20AFD	20A	30mA	2	2
NHXSB25AFD	-	25A	30mA	2	2
NHXSB32AFD	NHXSC32AFD	32A	30mA	2	2
NHXSB40AFD	NHXSC40AFD	40A	30mA	2	2

Select consumer unit and appropriate busbar from following information

AFDD NMX BUSBAR

CAT REF	DESCRIPTION
NMBBX18AFDD01	1W AFDD NMX busbar
NMBBX16AFDD02	2W AFDD NMX busbar
NMBBX14AFDD03	3W AFDD NMX busbar
NMBBX12AFDD04	4W AFDD NMX busbar
NMBBX10AFDD05	5W AFDD NMX busbar
NMBBX08AFDD06	6W AFDD NMX busbar
NMBBX06AFDD07	7W AFDD NMX busbar
NMBBX04AFDD08	8W AFDD NMX busbar
NMBBX02AFDD09	9W AFDD NMX busbar
NMBBX00AFDD10	10W AFDD NMX busbar

AFDD NM FLEXIBLE BUSBAR

CAT REF	DESCRIPTION
NMBB17AFDD01	1W AFDD flexible busbar
NMBB15AFDD02	2W AFDD flexible busbar
NMBB13AFDD03	3W AFDD flexible busbar
NMBB11AFDD04	4W AFDD flexible busbar
NMBB09AFDD05	5W AFDD flexible busbar
NMBB07AFDD06	6W AFDD flexible busbar
NMBB05AFDD07	7W AFDD flexible busbar
NMBB03AFDD08	8W AFDD flexible busbar
NMBB01AFDD09	9W AFDD flexible busbar

For further information please contact Wylex technical 01543 438321

NMX & NM Flexible Consumer Units

NMX16

NM1406LFLEX

MAIN SWITCH - WITH KNOCKOUTS ALL SIDES

CAT REF	RATING	MODULES	AFDD WAYS	KNOCKOUTS
NMX16	100A	16	8	All sides
NMX20	100A	20	10	All sides

MAIN SWITCH - PLAIN SIDES

CAT REF	RATING	MODULES	AFDD WAYS	KNOCKOUTS
NMX16P	100A	16	8	Rear only (plain sides)
NMX20P	100A	20	10	Rear only (plain sides)

Select appropriate AFDD busbar

DIMENSIONS

CAT REF	HEIGHT mm	WIDTH mm	DEPTH mm
NMX16	235	372	125
NMX16P	235	372	125
NMX20	235	445	125
NMX20P	235	445	125

FLEXIBLE MAIN SWITCH

CAT REF	MS RATING	MODULES	AFDD WAYS
NM506FLEX	100A	5	2
NM806FLEX	100A	8	4
NM1106FLEX	100A	11	5
NM1406FLEX	100A	14	7
NM1906FLEX	100A	19	9

DIMENSIONS

CAT REF	HEIGHT mm	WIDTH mm	DEPTH mm
NM506FLEX	261	188	121
NM806FLEX	261	241	121
NM1106FLEX	261	292	121
NM1406FLEX	261	343	121
NM1906FLEX	261	438	121

NM Duplex Consumer Units & Accessories

NMD1112

EIU

NMTG32

NMCE1

MAIN SWITCH DUPLEX

CAT REF	MS RATING	MODULES	AFDD WAYS
NMD89	100A	17	8
NMD1112	100A	23	11
NMD1415	100A	29	14
NMD1920	100A	39	19

DIMENSIONS

CAT REF	HEIGHT mm	WIDTH mm	DEPTH mm
NMD89	500	241	127
NMD1112	500	292	127
NMD1415	500	343	127
NMD1920	500	438	127

NM ACCESSORIES

CAT REF	PRODUCT	MODULE
NMMB	Metal blanking plate - Twist fit	1
NHB1PP	Blanking plate - Busbar & cover	1
NH00PP	Blanking plate - Twist fit	1
NHET25	25mm Earth Terminal	-
NMLDK	Angled visor locking kit	
NMTLK2	Curved visor locking kit	
MCBLDX	MCB locking device	
WPL	Padlock for NHLDK & MCBLDX	

MAINS TAILS GLAND

EIU	Moulded cable gland kit for metal consumer unit to provide additional support and supplementary insulation similar to Class II construction for the incoming cables. Suitable for 16mm^2 or 25mm^2 double insulated cable and 16mm^2 earth cable 32mm knockout
NMTG32	Flush 'push fit' moulded cable gland for metal consumer unit to provide additional support and supplementary insulation similar to Class II construction for the incoming cables. Suitable for 16mm^2 or 25mm^2 double insulated cable and 16mm^2 earth cable 32mm knockout

FIRE RETARDENT MEMBRANE CABLE ENTRIES

NMCE1	Membrane cable entries kit 1 3 x 32mm & 7 x 20mm
NMCE2	Membrane cable entries kit 2 10 x 20mm

FLUSH MOUNTING KITS FOR NM FLEXIBLE

NM07FLA	7 module flush kit assembly
NM10FLA	10 module flush kit assembly
NM13FLA	13 module flush kit assembly
NM16FLA	16 module flush kit assembly
NM21FLA	21 module flush kit assembly

Not suitable for meter cabinet units

NM CONSUMER UNIT PATTRESSES FOR NM FLEXIBLE

CAT REF TOP/BOTTOM	LEFT/RIGHT CABLE ENTRY	ENCLOSURE WIDTH	DEPTH
MNSPE-6462/BNR	MNSPE6668/7NR	7 Module	16mm
MNSPE-6462/CNR	MNSPE6668/10NR	10 Module	16mm
MNSPE-6462/DNR	MNSPE6668/13NR	13 Module	16mm
MNSPE-6462/ENR	MNSPE6668/16NR	16 Module	16mm
MNSPE-6462/FNR	MNSPE6668/21NR	21 Module	16mm

For use with NM consumer units. Allows surface cable entry through rear knockouts and automatically maintains enclosure IP rating to comply with BS7671 and BSEN61439-3

• Cable entry slot may be positioned top or bottom, or left/right

Not suitable for meter cabinet units

Electrium

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Publication No. WY2440 8/18
Printed in England.

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