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### 3.01 General Description.

- 3.01.01 The Armoured system is based around 3, 4 or 5 pin connectors, offering 3, 4 or 5 wire distribution.
- 3.01.02 The Armoured system utilises different plug and socket (port) components for Lighting, Power and Network distribution.
- 3.01.03 The Armoured system is rated at 20A (but see clause 3.01.06). This rating applies to all Extender cables, T's, Distribution and Whip End Extender cables, and Switch Modules. However, the overall rating is dependent upon the type and size of feeder cable used.
- 3.01.04 As a guide, the Armoured system is rated as follows: -

FEEDER CABLE TYPE	SYSTEM RATING
Distribution Cable	20A
3.33mm <sup>2</sup> 18 & 27 core Home Run Cable	16A
5.27mm <sup>2</sup> 18 & 27 core Home Run Cable	20A
See clause 3.01.06	40A

- 3.01.05 Conductor ratings are listed in Appendix A. These are limited to 20A by the rating of the Armoured plugs and sockets (ports). The above rating of 16A is a worst case, considering simultaneous overload conditions. (For further details, refer to Appendix 4 of BS7671: 1992). These ratings are good for both Single and Three Phase applications.
- 3.01.06 A true 40A system is available by using Home Run conductors in parallel, and either 4mm<sup>2</sup> or 6mm<sup>2</sup> Extender cables. This rating can only be applied to Single Phase systems.
- 3.01.07 Every manufactured and assembled component has a label attached, providing details of product ID and verification of passing testing. (See Section 10.00).
- 3.01.08 It is common practice to utilise components for different applications. Terminations should be made in accordance with the drawings provided.

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#### 3.02 Home Run Cable/Master Distribution Boxes (MDB's).

- 3.02.01 The standard conductor csa is 3.33mm<sup>2</sup> or 5.27mm<sup>2</sup>. Conductors are single core THHN insulated, having stranded copper cores. A MyLAR<sup>®</sup> tape is wrapped around the collective conductors.
- 3.02.02 These conductors are contained within a spiral interlocked, galvanised steel armouring. The Home Run cables are typically 18 or 27 core, providing 6 or 9 P/N/E circuits. Conductor insulation is coloured RED for phase, BLACK for neutral and GREEN/YELLOW for earth.
- 3.02.03 Conductors are indelibly marked with numbers indicating which circuit they represent. The standard configuration for an 18 conductor Home Run is 1 6 (over RED ~ BLACK ~ GREEN/YELLOW). For 27 conductors, numbering is 1 9.
- 3.02.04 For further details of conductors, refer to Section 1.06 of this manual.
- 3.02.05 The MDB is fashioned from pressed sheet steel, having a black, powder coat, painted finish. The cover is secured via zinc plated cross head screws, and labelled to indicate 'port' configuration, distribution board and circuit references. In addition, each MDB is provided with a unique manufacturing code for identification and record purposes.
- 3.02.07 MDB's are generally 6 or 9 port (refer to 3.02.02 and 3.02.03). Each 'port' comprises a connector fixed to the MDB via four N° zinc plated rivets. (See Fig. 3.01). For details of ports, refer to Section 3.08.



- Fig. 3.01
- 3.02.08 The Home Run cable is secured to the MDB using a cast alloy clamp and the conductors are pre-terminated into the ports. Additional Home Run cables can be attached to the MDB as necessary to achieve variations on the standard circuit configuration.

## 3.02 Home Run Cable/Master Distribution Boxes (MDB's) Continued.

- 3.02.08 Home Run cables are terminated at the point of distribution using specially manufactured glands. For details of stripping and terminating armouring, refer to Sections 3.09 & 3.11
- 3.02.09 When terminating the Home Run cable, the galvanised armouring may be stripped back, using a 'Roto Cutter'. Under no circumstances should removal of the armouring be attempted without using the special tool.
- 3.02.10 MDB's for use with the Armoured system are factory-assembled units to BSEN60439: Part II: 1993 and as such should not be altered in any way.

### 3.03 Extender Cable.

- 3.03.01 The standard cable comprises of 3, 4 or 5 N° 3.33mm<sup>2</sup> conductors . This typically provides 1, 2 or 3 'Live' connections plus Neutral & Earth. Conductors are single core THHN insulated, having solid copper cores. A MYLAR<sup>®</sup> tape is wrapped around the conductors collectively.
- 3.03.02 Conductors are contained within a spiral interlocked, galvanised steel armouring. At one end, conductors terminate in a factory sealed plug (male), the 'Power In port. At the other end, conductors terminate in a factory sealed socket (female), the 'Power Out' port. (See Fig. 3.02).



<u>Fig. 3.02</u>

- 3.03.03 Plugs and sockets comprise terminal connectors housed within a cold-rolled steel, riveted and tamper proof enclosure, having a galvanised finish. For further details, refer to Section 3.08.
- 3.03.04 Extender cables are factory sealed units to BSEN60439: Part II: 1993 and as such, should not be altered in any way.

# 3·04 <u>**T**′s.</u>

- 3.04.01 The standard T comprises of 3, 4 or 5 N° 3.33mm<sup>2</sup> through conductors. This typically provides 1, 2 or 3 'Live' connections plus Neutral & Earth. Conductors are single core THHN insulated, having solid copper cores.
- 3.04.02 Connections to appliances/equipment can be effected via the following methods: -
  - Direct connection using 'snap fit' connector or bush and lock rings.
  - Flying lead using an appropriate terminating gland.
- 3.04.03 For direct connection, the standard configuration comprises of 3, 4 or 5 N° 2.09mm<sup>2</sup> or 3.33mm<sup>2</sup> conductors. This typically provides 1, 2 or 3 'Live' connections plus Neutral & Earth. (See Fig. 3.03).
- 3.04.04 Conductors are single core, TFN or THHN insulated, having solid copper cores.



Fig. 3.03

- 3.04.05 For flying lead connections, an Armoured Cable Drop is used. (See Fig. 3.04). Conductors, generally as described in 3.04.03 and 3.04.04, are contained within a spiral interlocked, galvanised steel armouring. For details of stripping and terminating armouring, refer to Sections 3.09 & 3.11.
- 3.04.06 An alternative flying lead connection utilises a Cord Drop. This comprises 1.0mm<sup>2</sup>, 1.5mm<sup>2</sup> or 2.5mm<sup>2</sup> conductors. Conductors are LSF insulated, LSF sheathed having 3, 4 or 5 solid copper cores. (See fig. 3.05).

3.04.07 For further details of conductors, refer to Section 1.06 of this manual.

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# 3.04 <u>T's Continued.</u>









- 3.04.08 T's comprise terminal connectors housed within a cold-rolled steel, riveted and tamper proof enclosure, having a galvanised finish. Male plugs are fitted at the 'Power In' port and female sockets are fitted at the 'Power Out' port. (See Fig. 3.03, 3.04 and 3.05). For further details, refer to Section 3.08.
- 3.04.09 T's are factory sealed units to BSEN60439: Part II: 1993 and as such, should not be altered in any way.

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#### 3.05 Switched Fused T's.

- 3.05.01 The Switched Fused T comprises of 3 N° 3.33mm<sup>2</sup> through conductors. This typically provides Live, Neutral & Earth connections. Conductors are single core THHN insulated, having solid copper cores.
- 3.05.02 Connections to appliances/equipment can be effected via the following methods: -
  - Direct connection using male bush and lock rings.
  - Flying lead using an appropriate terminating gland.
- 3.05.03 Standard direct connection comprises of 3 N° 1.5mm<sup>2</sup> conductors providing Live, Neutral & Earth connections. (See Fig. 3.06). Conductors are single core LSOH insulated, having stranded copper cores.
- 3.05.04 For flying lead connections, a Cord Drop is used. This comprises 1.5mm<sup>2</sup> conductors. Conductors are LSF insulated, LSF sheathed having stranded copper cores. (See Fig. 3.07).
- 3.05.05 For further details of conductors, refer to Section 1.06 of this manual.



# SWITCHED FUSED TEE

### <u>Fig. 3.06</u>

3.05.06 T's comprise terminal connectors housed within a cold-rolled steel, riveted and tamper proof enclosure, having a galvanised finish. Male plugs are fitted at the 'Power In' port and female sockets are fitted at the 'Power Out' port. For further details, refer to Section 3.08.

#### 3.05 Switched Fused T's Continued.



SWITCHED FUSED TEE

Fig. 3.07

- 3.05.07 The T housing is fashioned from 1.2mm thick pressed sheet steel, having a galvanised finish. The cover is secured via zinc plated cross head screws, and labelled to indicate 'port' and 'connection' configuration. (See Fig. 3.06 and 3.07).
- 3.05.08 Live and Neutral conductors are switched via a double pole switch prior to being connected to equipment. Additionally, the live conductor is fused via a BS1362 fuse link (up to a maximum of 13A). The fuse holder is a screw in type. Connections to the double pole switch and fuse holder are effected using 'push-on' type contacts.
- 3.05.09 The double pole switch is rated at 16A (resistive) 4A (inductive) 250A a.c. to BSEN61058: Part I: 1992.
- 3.05.20 Switched Fused Ts are factory assembled units and should not be altered in any way.

### 3.06 Distribution & Whip End Extender Cables.

- 3.06.01 The standard cable comprises of 3, 4 or 5 N° 3.33mm<sup>2</sup> conductors. This typically provides 1, 2 or 3 'Live' connections plus Neutral & Earth. Conductors are single core THHN insulated, having solid copper cores. A MYLAR<sup>®</sup> tape is wrapped around the collective conductors.
- 3.06.02 For further details of conductors, refer to Section 1.06 of this manual.
- 3.06.03 Distribution cables are generally as described in 3.03.02, except there is no male plug at the start (no 'Power In' port) see Fig. 3.08).
- 3.06.04 Whip End cables are generally as described in 3.03.02, except there is no female socket at the end (no 'Power Out' port) see Fig. 3.08).





<u>Fig. 3.08</u>

- 3.06.05 For details of stripping and terminating armouring, refer to Sections 3.09 & 3.11.
- 3.06.06 Plugs and sockets comprise terminal connectors housed within a cold-rolled steel, riveted and tamper proof enclosure, having a galvanised finish. For further details, refer to Section 3.08.
- 3.06.07 Distribution & Whip End cables are factory sealed units to BSEN60439: Part II: 1993 and as such, should not be altered in any way.

## 3.07 Switch Modules.

- 3.07.01 The standard cable comprises of 3, 4 or 5 N° 3.33mm<sup>2</sup> conductors.. This typically provides 1, 2 or 3 'Live' connections plus Neutral & Earth. Conductors are single core THHN insulated having solid copper cores. A MYLAR<sup>®</sup> tape is wrapped around the collective conductors.
- 3.07.02 Switch Module cable drops are generally as described in 3.03.02, except a plug/socket is not fitted at the end, to facilitate on-site termination at a switching device. (See Fig. 3.09). Switch cable drop insulation is coloured RED for switched and un-switched (these are labelled for identification purposes), and GREEN/YELLOW for earth conductors
- 3.07.03 For further details of conductors, refer to Section 1.06 of this manual.





<u>Fig. 3.09</u>

- 3.07.04 For details of stripping and terminating armouring, refer to Sections 3.09 & 3.11.
- 3.07.05 Plugs and sockets comprise terminal connectors housed within a cold-rolled steel, riveted and tamper proof enclosure, having a galvanised finish. For further details, refer to Section 3.08.
- 3.07.06 Switch Modules are factory sealed units to BSEN60439: Part II: 1993 and as such, should not be altered in any way.

#### 3.08 Plugs & Sockets (Ports).

- 3.08.01 Plugs and sockets comprise terminal connectors housed within a cold-rolled steel, riveted and tamper proof enclosure, having a galvanised finish. (See Fig. 3.10).
- 3.08.02 Connectors are identified by the component number '120' or '277'. Generally, lighting systems are '277' and power systems are '120'.
- 3.08.03 Connectors have a sprung steel interlocking clip and latching arrangement. These are different for a '120' and a '277' connector, so a '120' plug or socket cannot connect with a '277' plug or socket.



#### Fig. 3.10

- 3.08.04 Terminals are encased in injection moulded "Lexan #141". The terminal encasing is colour coded to differentiate between the various systems.
- 3.08.05 The moulding around the terminals is such that two of the pins have a 'slotted key' arrangement. This ensures that different coloured terminals cannot be connected together.
- 3-08-06 Generally, 'CLEAR' is used for Power systems, 'BLACK' is used for Lighting systems, 'ORANGE' is used for Network Power systems and 'PURPLE' is used for Network Lighting systems.
- 3.08.07 Contacts are tinned copper alloy, generally configured 3, 4 or 5 pole, 'pushin' type.

### 3.09 <u>MC Cable.</u>

- 3.09.01 The standard cable comprises of 3, 4 or 5 N° conductors, having a csa between 1.5mm<sup>2</sup> and 35mm<sup>2</sup>. Conductors are single core THHN insulated having stranded copper cores.
- 3.09.02 An identification tape runs throughout the length of the cable providing details of the cable type and csa. Additionally, a MYLAR<sup>®</sup> tape is wrapped around the collective conductors.
- 3.09.03 These conductors are contained within a spiral interlocked, galvanised steel armouring. MC cable may be terminated into equipment using the AMC-20, 'TB' or 'PD' range of glands. (See Fig. 3.11 and for further details, refer to Section 3.11).



### <u>Fig. 3.11</u>

- 3.09.04 The galvanised armouring may be stripped back, using a 'Roto Cutter'. Under no circumstances should removal of the armouring be attempted without using the special tool.
- 3.09.05 For further details of conductors, refer to Section 1.06 of this manual.

## 3.10 FACC Cable.

- 3.10.01 The construction of FACC cables is similar to MC cable. The quantity and type of conductors include STP/UTP Cat 5 data/voice, Fibre, Fire and Co-Axial. Further details are available upon request.
- 3.10.02 These conductors are contained within a spiral interlocked, galvanised steel armouring. FACC cable may be terminated into equipment using the AMC-20, 'TB' or 'PD' range of glands. (For further details, refer to Section 3.11).
- 3.10.03 The galvanised armouring may be stripped back, using a 'Roto Cutter'. Under no circumstances should removal of the armouring be attempted without using the special tool.

### 3.11 Terminating Glands.

- 3.11.01 <u>AMC-20:</u> These are suitable for terminating MC & FACC cables directly into a standard 20mm Ø knockout. A one-piece gland, the AMC-20 has an expanding clamp action, and is fashioned from galvanised steel.
- 3.11.02 <u>TB Gland:</u> These are suitable for terminating MC & FACC cables into various size knockouts. The TB range are all one-piece, having a clamp action, and are fashioned from galvanised steel.
- 3.11.03 <u>PD Gland:</u> These are provided with a 16mm, 20mm or 25mm thread for terminating MC & FACC cables at BESA boxes.
- 3.11.04 <u>HR Gland:</u> These are provided with a <sup>3</sup>/<sub>4</sub>" or a 1" thread for terminating Home Run cables and are fashioned from die-cast alloy. Arlington glands are supplied with both a metal and a plastic locking ring.
- 3.11.05 <u>Insulating Bushes:</u> These are required to be fitted to the cut ends of MC, FACC & Home Run cables. Bushes are fashioned from PVC.
- 3.11.06 For further details of installation and termination, refer to Section 7.00.

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### 3-12 Additional Components.

- 3.12.01 <u>Interface Distribution Box (IFDB)</u>: These are similar to MDB's, but without the Home Run cable. These are generally used in conjunction with a header trunking and rarely provide more than 6 ports.
- 3.12.02 <u>MC Distribution Box (MC DB)</u>: These are similar to MDB's, but are not fitted with ports. MC cables terminate at the box and are wire to terminal rails on site.
- 3.12.03 <u>MC Interface Distribution Box (MC IFDB)</u>: These are similar to IFDB's, but are not fitted with ports. MC cables terminate at the box and are wire to terminal rails on site.
- 3.12.04 <u>Zone Distribution Box (ZDB):</u> Again, these are similar to MDB's, but instead of a Home Run cable, an extender is used to provide the feed, which is sub-distributed within a particular area. These can equally be used in conjunction with MDB's to distribute power to the ZDB.
- 3.12.05 <u>230/24V Switched Fused T:</u> These are generally the same as the Switched Fused T, but with an additional 24V a.c. L&N or L/N&E output. A 2VA double wound isolating transformer is fitted integrally to the T.
- 3.12.06 <u>Data/Voice Systems:</u> These mirror the power system, offering Zone and Interface Distribution Boxes incorporating STP/UTP Cat 5 and fibre optic cable media. A range of RJ45 plugs and sockets effect connections. Cables are armoured as the power products and cables are stripped and terminated as detailed in Section 3.09.
- 3.12.07 <u>Dust Caps:</u> These are fitted to every port on and MDB and should be removed to allow the connection of an Extender Cable. Once the installation is complete, they should be fitted to the last component on the circuit. Where Distribution cables and/or Switch Modules are supplied, additional Dust Caps are provided.
- 3.12.08 <u>Roto Cutter:</u> These are essential for removing the armour from any MC or FACC type cable, without damaging the conductors, or their insulation.
- 3.12.09 <u>Finishes:</u> Variations to standard product finish are available including colouring to cable Armour, coloured, insulating 'jacketing' over cable Armour and painted finishes to T's etc.

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### 4.01 General Description.

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- 4.01.01 The basic principle is generally as the Armoured system, based around 3, 4, 5 or 6 pin connectors, offering 3, 4, 5 or 6 wire distribution. Non-metallic plugs, sockets and T's are used, and the cable is un-armoured.
- 4.01.02 The Un-Armoured system utilises different plug and socket (port) components for Lighting, Power and Network distribution.
- 4.01.03 The Un-Armoured system is rated at 16A. This rating applies to all Extender cables, T's, Distribution and Whip End Extender cables, and Switch Modules. However, the overall rating is dependent upon the type and size of feeder cable used.
- 4.01.04 As a guide, the Un-Armoured system is rated as follows: -

FEEDER CABLE TYPE	SYSTEM RATING
Distribution Cable	16A
2.50mm <sup>2</sup> 18 & 27 core Home Run Cable	10A
3.33mm <sup>2</sup> 18 & 27 core Home Run Cable (Armoured)	16A

- 4.01.05 Conductor ratings are listed in Appendix A. These are limited to 16A by the rating of the Un-Armoured plugs and sockets (ports). The above rating of 10A is a worst case, considering simultaneous overload conditions. (For further details, refer to Appendix 4 of BS7671: 1992). These ratings are good for both Single and Three Phase applications.
- 4.01.07 Every manufactured and assembled component has a label attached, providing details of product ID and verification of passing testing. (See Section 10.00).
- 4.01.08 It is common practice to utilise components for different applications. Terminations should be made in accordance with the drawings provided.

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#### 4.02 Home Run Cable/Master Distribution Boxes (MDB's).

- 4.02.01 The standard conductor csa is 2.50mm<sup>2</sup>. Conductors are single core LSF insulated, having stranded copper cores. The earth connections are made on a 'bused' basis, providing 2 N° 2.5mm<sup>2</sup> and 1 N° 4.0mm<sup>2</sup> conductors.
- 4.02.02 These conductors are contained within an LSF oversheath. The Home Run cables are typically 21 core, providing up to 9 P/N/E circuits. Conductor insulation is coloured RED for phase, BLACK for neutral and GREEN/YELLOW for earth.
- 4.02.03 Conductors are indelibly marked with numbers indicating which circuit they represent. The standard configuration for a 21 conductor Home Run is 1 9 (over RED ~ BLACK). There are 3 earth conductors.
- 4.02.04 For further details of conductors, refer to Section 1.06 of this manual.
- 4.02.05 The MDB is fashioned from pressed sheet steel, having a black, powder coat, painted finish. The cover is secured via zinc plated cross head screws, and labelled to indicate 'port' configuration, distribution board and circuit references. In addition, each MDB is provided with a unique manufacturing code for identification and record purposes.
- 4.02.07 MDB's are generally 6 or 9 port. (Refer to 3.02.03). Each 'port' comprises a connector fixed to the MDB via a flush, snap-fit, panel mounted connector. For details of ports, refer to Section 4.08.
- 4.02.08 Home Run cables are terminated at the point of distribution using specially manufactured glands.
- 4.02.09 MDB's for use with the Un-Armoured system are factory-assembled units and should not be altered in any way.

# 4.03 Extender Cable.

- 4.03.01 The standard cable comprises of 3, 4, 5 or 6 N° 1.5mm<sup>2</sup> or 2.5mm<sup>2</sup> conductors . This typically provides 1, 2, 3 or 4 'Live' connections plus Neutral & Earth. Conductors are LSF insulated, LSF sheathed having stranded copper cores.
- 4.03.02 For further details of conductors, refer to Section 1.06 of this manual.
- 4.03.03 At one end, conductors terminate in a factory assembled plug (male), the 'Power In port. At the other end, conductors terminate in a factory assembled socket (female), the 'Power Out' port. (See Fig. 4.01).



#### <u>Fig. 4.01</u>

- 4.03.04 Plugs and sockets comprise terminal connectors housed within a LSOH plastic enclosure. For further details, refer to Section 4.08.
- 4.03.05 Extender cables are factory assembled units to IEC 998 and should not be altered in any way.

## 4.04 <u>**T's.</u></u></u>**

- 4.04.01 The standard T comprises of 3, 5 or 6 N° 1.5mm<sup>2</sup> or 2.5mm<sup>2</sup> through conductors. This typically provides 1 or 3 or 4 'Live' connections plus Neutral & Earth. Conductors are single core, LSOH insulated having solid copper cores.
- 4.04.02 Connections to appliances/equipment can be effected via the following methods: -
  - Direct connection using bush and lock rings.
  - Flying lead using an appropriate terminating gland.
- 4.04.03 For direct connection, the standard configuration comprises of 3, 4, 5 or 6 N° 1.0mm<sup>2</sup>, 1.5mm<sup>2</sup> or 2.5mm<sup>2</sup> conductors. This typically provides 1, 2, 3 or 4 'Live' connections plus Neutral & Earth. (See Fig. 4.02).
- 4.04.04 Conductors are single core, LSOH insulated having solid copper cores.



- Fig. 4.02
- 4.04.05 For flying lead connections, a Cord Drop is used. This comprises 1.0mm<sup>2</sup>, 1.5mm<sup>2</sup> or 2.5mm<sup>2</sup> conductors. Conductors are LSF insulated, LSF sheathed having 3, 4,5 or 6 solid copper cores. (See Fig. 4.03).
- 4.04.06 For further details of conductors, refer to Section 1.06 of this manual.

# 4.04 <u>T's Continued.</u>



<u>Fig. 4.03</u>

- 4.04.07 T's comprise terminal connectors housed within a LSOH plastic enclosure. Male plugs are fitted at the 'Power In' port and female sockets are fitted at the 'Power Out' port. For further details, refer to Section 4.08.
- 4.04.08 T's are factory assembled units to IEC 998 and should not be altered in any way.

# 4.05 Switched Fused T's.

4.05.01 This section is currently under development.

# 4.06 Distribution & Whip End Extender Cables.

- 4.06.01 The standard cable comprises of 3, 4, 5 or 6 N° 1.5mm<sup>2</sup> or 2.5mm<sup>2</sup> conductors. This typically provides 1, 2, 3 or 4 'Live' connections plus Neutral & Earth. Conductors are LSF insulated, LSF sheathed having stranded copper cores.
- 4.06.02 For further details of conductors, refer to Section 1.06 of this manual.
- 4.06.03 Distribution cables are generally as described in 4.03.02, except there is no male plug at the start (no 'Power In' port) see Fig. 4.04).
- 4.06.04 Whip End cable is generally as described in 4.03.02, except there is no female socket at the end (no 'Power Out' port) see Fig. 4.04).





- 4.06.05 Plugs and sockets comprise terminal connectors housed within a LSOH plastic enclosure. For further details, refer to Section 4.08.
- 4.06.06 Distribution & Whip End cables are factory assembled units to IEC998 and should not be altered in any way.

# 4.07 Switch Modules.

- 4.07.01 The standard module comprises of 3 or 5 or 6 N° 1.5mm<sup>2</sup> or 2.5mm<sup>2</sup> through conductors. This typically provides 1, 3 or 4 'Live' connections plus Neutral & Earth. Conductors are single core, LSF insulated having solid copper cores.
- 4.07.02 Un-Armoured types do not have cables fixed directly to them. (See Fig 4.05). Whip End Extender Cables are utilised to drop down to switches. (See Fig. 4.04).
- 4.07.03 Plugs and sockets comprise terminal connectors housed within a LSOH plastic enclosure. For further details, refer to Section 4.08.
- 4.07.04 Switch Modules are factory assembled units to IEC 998 and should not be altered in any way.



Fig. 4.05

# 4.08 Plugs & Sockets (Ports).

- 4.08.01 Plugs and sockets comprise terminal connectors contained within a moulded housing.
- 4.08.02 The moulded housing is manufactured from self-extinguishing Polyamide 6.6 (PA6.6). This is an LSOH compound, with both zero Halogen and zero Cadmium properties.
- 4.08.03 Terminals are brass, having a tin plating finish.
- 4.08.04 The enclosures for T's and Switch Modules are manufactured from a Polypropylene based, 40% calcium carbonate reinforced compound.
- 4.08.05 The plugs and sockets are universal over lighting and power applications, although different combinations are available to differentiate between such applications.

# 4.09 Additional Components.

- 4.09.01 These are generally the same as for the Armoured system. For details, refer to Section 3.12.
- 4.09.02 <u>Emergency Lighting</u>: Modular components for use on emergency lighting circuits can be identified with RED coloured inserts. This option fully integrates with the standard range of products.
- 4.09.03 <u>Other Colours:</u> Are available for a range of other applications.

# 5.01 General Description.

5.01.01 This is generally as the Armoured Power system. The entire range is 5 wire, comprising 3 wires for Live, Neutral and Earth, with a shielded, twisted pair for a Building Controls Network.

## 5.02 <u>Network Home Run Cable/Master Distribution Boxes (MDB's).</u>

- 5.02.01 These are basically the same as those for the Armoured Power system. The Network version of the MDB has an additional FACC cable that runs back to a server location. The number of shielded, twisted pairs in the FACC cable depends upon the network protocol and configuration.
- 5.02.02 Fig. 5.01 shows how a single router channel and an 'A' and 'B' router channel configuration is achieved.



<u>Fig. 5.01</u>

### 5.03 Network Extender Cable.

- 5.03.01 These are basically the same as those for the Armoured Power system. The Network version of the Extender cable comprises of 3 N° power conductors and a shielded, twisted pair for the network. A MYLAR<sup>®</sup> tape is wrapped around the collective conductors.
- 5.03.02 Power conductors are 3.33mm<sup>2</sup>, providing Live, Neutral & Earth connections. Conductors are single core, THHN insulated having solid copper cores
- 5.03.03 Data conductors are 0.82mm<sup>2</sup>, single core, TFN insulated having solid copper cores. Insulation is coloured WHITE for 'NW1' and BLACK for 'NW2'.
- 5.03.04 An additional single core, un-insulated drain wire is also present. This is 0.82mm<sup>2</sup>, having a solid tinned copper core and is electrically connected to earth at the end only ('Network & Power Out' port). A foil shielding is wrapped around the shielded, twisted pair and drain wire. The shielding and drain wire are electrically insulated from extraneous metalwork via a MYLAR<sup>®</sup> wrapping.
- 5.03.05 These conductors are contained within a spiral interlocked, galvanised steel armouring. At one end, conductors terminate in a factory sealed plug (male), the 'Network & Power In' port. At the other end, conductors terminate in a factory sealed socket (female), the 'Network & Power Out' port.



### Fig. 5.02

- 5.03.06 Plugs and sockets comprise terminal connectors housed within a cold-rolled steel, riveted and tamper proof enclosure, having a galvanised finish. For further details, refer to Section 3.08.
- 5.03.07 Network Extender cables are factory sealed units to BSEN60439: Part II: 1993 and as such, should not be altered in any way.

### 5.04 <u>Network T's.</u>

- 5.04.01 These are basically the same as those for the Armoured Power system. The Network version of the T comprises of 3 N° power conductors and a shielded, twisted pair for the network.
- 5.04.02 Through power conductors comprise 3.33mm<sup>2</sup>, providing Live, Neutral & Earth connections. Conductors are single core, THHN insulated having solid copper cores.
- 5.04.03 Through network conductors comprise 0.82mm<sup>2</sup>, single core, THHN insulated having solid copper cores.
- 5.04.04 Connections to appliances/equipment can be effected via the following methods: -
  - Direct connection using 'snap fit' connector or bush and lock rings.
  - Flying lead using an appropriate terminating gland.
- 5.04.05 For direct connection, the standard configuration comprises of 3 N° 2.09mm<sup>2</sup> or 3.33mm<sup>2</sup> power conductors and 2 N° 0.82mm<sup>2</sup> network conductors. (See Fig. 5.03).



### Fig. 5.03

5.04.06 Conductors are single core, TFN or THHN insulated, having solid copper cores.

#### 5.04 Network T's Continued.

- 5.04.07 For flying lead connections, an Armoured Cable Drop is used. (See Fig. 5.04). Conductors, generally as described in 5.04.05 and 5.04.06, are contained within a spiral interlocked, galvanised steel armouring. For details of stripping and terminating armouring, refer to Sections 3.09 & 3.11.
- 5.04.08 The shielding and drain wire are present where the network conductors emanate from the T, but are not present over the short length where the network conductors terminate between ports.

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#### Fig. 5.04

- 5.04.09 For further details of conductors, refer to Section 1.06 of this manual.
- 5.04.10 T's comprise terminal connectors housed within a cold-rolled steel, riveted and tamper proof enclosure, having a galvanised finish. Male plugs are fitted at the 'Power In' port and female sockets are fitted at the 'Power Out' port. For further details, refer to Section 3.08.
- 5.04.11 T's are factory sealed units to BSEN60439: Part II: 1993 and as such, should not be altered in any way.

### 5.05 Network Switched Fused T's.

- 5.05.01 These are basically the same as those for the Armoured Power system. The Network version of the Switched Fused T comprises of 3 N° power conductors and a shielded, twisted pair for the network.
- 5.05.02 Through power conductors comprise 3 N° 3.33mm<sup>2</sup> providing Live, Neutral & Earth connections. Conductors are single core THHN insulated, having solid copper cores.
- 5.05.03 Network conductors do not run 'through' the T as for Armoured Power, but connect from each port to a 'Wiedmüller' type socket mounted on the T. The shielding and drain wire are not present where the network conductors emanate from the T, but are not present over the short length where the network conductors terminate between ports.
- 5.05.04 Connections to appliances/equipment can be effected via the following methods: -
  - Direct connection using male bush and lock rings.
  - Flying lead using an appropriate terminating gland.
- 5.05.05 Standard direct connection comprises of 3 N° 1.5mm<sup>2</sup> or 2.5mm<sup>2</sup> conductors providing Live, Neutral & Earth connections. Conductors are single core, LSOH insulated having solid copper cores. (See Fig. 5.05).



INSERT: ORANGE

#### Fig. 5.05

5.05.06 For flying lead connections, a Cord Drop is used. This comprises of 1.5mm<sup>2</sup>, or 2.5mm<sup>2</sup> conductors. Conductors are LSF insulated, LSF sheathed having 3 solid copper cores. (See Fig. 5.06).

## 5.05 Network Switched Fused T's Continued.



SWITCHED FUSED TEE

<u>Fig. 5.06</u>

- 5.05.07 For further details of conductors, refer to Section 1.06 of this manual.
- 5.05.08 T's comprise terminal connectors housed within a cold-rolled steel, riveted and tamper proof enclosure, having a galvanised finish. Male plugs are fitted at the 'Power In' port and female sockets are fitted at the 'Power Out' port. For further details, refer to Section 3.08.
- 5.05.09 Network connections are provided via a double gang, 4 pin 'Wiedmüller' type plug and socket. For direct mounted T's, the network cables can run alongside the power conductors.
- 5.05.10 The T housing is fashioned from 1.2mm thick pressed sheet steel, having a galvanised finish. The cover is secured via zinc plated cross head screws, and labelled to indicate 'port' and 'connection' configuration.
- 5.05.11 Live and Neutral conductors are switched via a double pole switch prior to being connected to equipment. Additionally, the live conductor is fused via a BS1362 fuse link (up to a maximum of 13A). The fuse holder is a screw in type. Connections to the double pole switch and fuse holder are effected using 'push-on' type contacts.
- 5.05.12 The double pole switch is rated at 16A (resistive) 4A (inductive) 250A a.c. to BSEN61058: Part I: 1992.
- 5.05.13 Switched Fused Ts are factory assembled units to BSEN60439: Part II: 1993 and should not be altered in any way.

### 5.06 Network MC Cable.

- 5.06.01 The standard cable comprises of 5 N° conductors. Power conductors comprise 3 N° 1.5mm<sup>2</sup>, 2.5mm<sup>2</sup> or 4.0mm<sup>2</sup> THHN insulated having stranded copper cores, providing Live, Neutral & Earth connections.
- 5.06.02 The remaining 2 N° conductors comprise 0.82mm<sup>2</sup> single core, TFN insulated having solid copper cores, providing 'NW1' and 'NW2' connections.
- 5.06.03

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A foil shielding is wrapped around the shielded, twisted pair and drain wire. Both the shielding and drain wire are electrically insulated form extraneous metalwork via a MYLAR<sup>®</sup> wrapping (when terminated correctly).

5.06.04

For further details of conductors, refer to Section 1.06 of this manual. 5.06.05

An identification tape runs throughout the length of the cable providing details of the cable type and csa. Additionally, a  $M{\rm YLAR}^{\rm @}$  tape is wound over the conductors.

5.06.06

These conductors are contained within a spiral interlocked, galvanised steel armouring. 'MC' cable may be terminated into equipment using the AMC-20, 'TB' or 'PD' range of glands. (For further details, refer to Section 3.11).

5.06.07

The galvanised armouring may be stripped back, using a 'Roto Cutter'. Under no circumstances should removal of the armouring be attempted without using the special tool.

# 5.07 **FACC Cable.**

- 5.07.01 The construction of FACC cables is similar to MC cable. The quantity and type of conductors include STP/UTP Cat 5 data/voice, Fibre, Fire and Co-Axial. Further details are available upon request.
- 5.07.02 These conductors are contained within a spiral interlocked, galvanised steel armouring. MC cable may be terminated into equipment using the AMC-20, 'TB' or 'PD' range of glands. (For further details, refer to Section 3.11).
- The galvanised armouring may be stripped back, using a 'Roto Cutter'.
- 5.07.03 Under no circumstances should removal of the armouring be attempted without using the special tool.

# 5.08 Additional Components.

5.08.01 These are generally the same as for the Armoured system. For details, refer to Section 3.12.

# 6.01 General Description.

6.01.01 This section is currently under development.